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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The Coal Settlement

THE first feeling produced in the chemical trade by the announcement of the settlement of the coal strike will be one of profound relief. All other considerations for the moment will be submerged by the thought that what has been regarded for some time as the chief obstacle to any forward movement in trade is at last removed. The settlement will bring a new sense of confidence to business men. That in itself is a valuable asset, for while confidence is lacking people refrain from the legitimate risks which attend even sound trading. Once the stagnation which has existed now for some time is broken, it is hoped that business will begin to move fairly quickly. The conditions certainly favour the idea. Speculation has been eliminated, stocks are exhausted, the tone is eager and expectant. Even a small demand would have a promptly quickening effect all round. One can hardly expect this favourable reaction to appear immediately. Within a few weeks, however, the change should be palpable, and the confidence of the merchant class in their own future will be one of the chief factors in bringing it about.

The fact of the settlement, therefore, is welcome on every side. When, however, its principles and terms come to be examined, one is assailed by grave doubts as to its economic soundness, and therefore as to its permanence. It seems but a part of that shifty, short-cut finance, by which official extravagance is made to show illusive profits on paper. It might be truly described as the crowning example of the Addisonian method. Nowhere in the negotiations or in the agreement resulting from them is there any trace of the economy which the nation so much needs for its commercial and financial recovery. It is a fair sample of what may be expected when the politicians and the socialists get complete command of industry.

The arrangement is widely advertised as a profit-sharing triumph, and as supplying the basis on which industry will in the future be regulated. In reality, the profits of the coal industry will be regulated not by its efficiency, not by production, not by quality, not by the rate or convenience at which coal is placed at the service of the community. They will depend on the amount of money paid to the miners. It recalls the percentage basis of production which was introduced with disastrous results during the war. The war contractor did not tender in the ordinary commercial way. Quite apart from production he got a fixed percentage of profit on what he expended in material and wages. The higher the wages he paid, the greater his own profit; the more material he used up, the larger became his own reward. It was unreasonable to expect human nature to resist such temptations to waste. And the coal settlement threatens to foster the same reckless spirit. While the owners' profits go up or down with the increase or decrease of the wages bill, what incentive is there left to utilise invention, engineering, electrical, chemical or other science for the production of increased quantities of coal at an ever diminishing cost? And yet everyone knows that the increase and the cheapening of production are what national industry calls for. All this short-sighted State tinkering with trade, this constant satisfying of temporary claims by fresh mortgages on our future, is corrupting the public sense of sound economics and finance, and glad as we all are to secure peace, we have little faith in this policy of trifling with right principles and trusting to luck to dodge the consequences.

The Fuel Research Station

DURING the past week those interested in the problem of the more efficient utilisation of fuel have been given exceptional facilities for studying the methods which have been adopted and the lines upon which investigation is being carried out by the Fuel Research Board at their model experimental station at East Greenwich. It so happens that Sir George

Beilby, who directs the operations, is a man who believes in publicity; and, in order that the results which he has attained may be turned to account as soon as possible, he threw open the station for the inspection of the members of many of the recognised societies and institutions and also the technical Press. This, in itself, is a concession which one does not generally expect from an official department, and it has created a precedent which should serve as a useful object lesson to those departmental heads who have a predisposition for locking up their secrets in registers and records which no member of the general public ever sees. The Fuel Research Board, in fact, is in some respects very much akin to the United States Bureau of Mines. Experiments are conducted, and will continue to be conducted, on all manner of problems which demand special facilities, and it would seem that as data and results are collected they are to be scattered broadcast for the benefit of anyone who cares to turn them to account in industrial operations. Descriptions of the lay-out of the station and the apparatus it contains have already been given in the Reports which the Board issued in 1918 and 1919, and the general features are already well-known. In the main, the research is associated with the carbonization of coal at high and low temperatures—particularly the latter, although many other potential and frequently unusual fuel substances have come in for their share of attention.

In view of the fact that this is the first occasion on which the station has been thrown open for public inspection THE CHEMICAL AGE deputed a well-known carbonization expert to inspect the plant and processes and record his impressions. He informs us that he anticipated a conglomeration of highly academically developed apparatus such as one would expect to be designed by a professor who had no acquaintance with practical works' requirements—beautiful, in fact, but hopelessly unsuited to ordinary industrial conditions. On the contrary he found that all those small but important points which one runs up against in the daily round had been carefully considered, the practical element was most noticeable, while the chief engineer (Commander Fraser Shaw) and the chief chemist (Mr. J. C. King) were eager to discuss problems which one would scarcely have expected them to be familiar with. One gained the impression, in fact, that there was a perfect balance between their conceptions of the demands of theory and the insistence of practice.

The variety of the investigations is illustrated by the fact that in addition to coal (both disintegrated and pulverized) experiments have been conducted with coke, semi-coke, peat, and seaweed. The last-named will, no doubt, attract a great deal of attention, for it is a decidedly unconventional fuel substance. It appears, however, to behave quite well when carbonized, and will yield (per ton dried to 30 per cent. moisture) about 16 gallons of tar oils, 1,500 cubic feet of gas having a calorific power of 560 B.Th.U., and 5¼ cwts. of charcoal residue. The gas, naturally, is poor, for it contains about 38 per cent. of carbon dioxide, although a redeeming feature is 27 per cent. of paraffins and 5 per cent. of unsaturated hydrocarbons. As regards coal carbonization the impression formed was that the Board has a decided *penchant* for low temperature methods, and in this direction they have obtained results—particularly in the way of semi-coke briquettes—which will make the stoutest advocate of high temperature processes consider whether he has not been mistaken. In all, the character of the work conducted commands a great deal of admiration both for Sir George Beilby and for those he has gathered round him.

Science and Key Industries

THE growing suspicion with which commercial interests regard our embarkation on a policy of protection for selected "key" industries will be reinforced by the spirited appeal against the Safeguarding of Industries Bill just issued by some 46 professors and teachers of science at English, Scottish and Welsh universities. It is too much to hope that even this statement will seriously affect the passage of the Bill, for the House of Commons has been reduced to a state of servility to party interests in which the arguments may be all on one side and the votes nearly all on the other. Nor can one hope for salvation from the Lords, for the measure is a financial one, and the Upper House must choose between accepting or rejecting it as it stands without amendment. We may, therefore, make up our minds for a measure which must certainly penalise the purchasing and trading public in order to bring what may possibly prove to be illusive benefits to the manufacturing class.

This fact, however, does not rid the protest of its interest or significance. The view of the signatories, all interested in promoting chemical and physical research and scientific inquiry, is that the policy of excluding the chemical products of Germany and other foreign countries, while aiming at the encouragement of our own manufactures, will fail to increase or even to maintain scientific supplies. It will have the effect of raising the price of all such requirements and destroying the stimulus of foreign competition towards improvements in British articles. Thus this policy will ultimately hinder the advance of scientific knowledge in this country and place us at a disadvantage with Germany, whose leading position in scientific research will be made unassailable. Research students, they contend, must be allowed to purchase such essentials as scientific books, glassware, apparatus, instruments, and chemicals in the cheapest possible markets wherever and whenever they are required. Many articles in use in university laboratories cannot be found at present in this country, while in the majority of cases where the article is produced both in this country and in Germany experience shows that the German product is cheaper and better than the British. To exclude the German manufactures would therefore be to put a check on all research work, and do so at a time when such investigations are urgently needed after five years of waste and interruption of study.

Perhaps the most striking passage is that in which the professors frankly urge that "in the interests of a high standard of scientific production, British manufacturers should not be allowed to 'safeguard' themselves from foreign competition, but should turn their attention far more closely than in the past to the needs of British research work. Already the Reparation Act has held up our work by creating numerous diffi-

culties between British consumers and German manufacturers of chemical requirements. To add to this expense and trouble would be to create further anxieties for all concerned in the state of university finances." "This," the signatories say in conclusion, "is not a question of party or political prejudice. In the sole interests of research students and of all who are promoting the cause of scientific education at our British universities, we desire to register our protest against the new policy of restricting imports."

Dryness of Pulverized Coal

THE utilization of pulverized coal is commencing to assume such importance that any developments which occur from time to time are well worth recording. Oil certainly has been monopolising attention lately; but, when once the coal industry has settled its domestic differences, the alternative and more highly efficient methods of employing coal are sure to attract the due amount of attention which they deserve. Some American investigators, who have been conducting extended tests on a 500 horse-power boiler fired with pulverized coal, have just concluded that the grinding and drying of the coal need not necessarily be carried out so thoroughly as has hitherto been considered necessary. It has generally been understood, for instance, that pulverized coal must be dried to about 1 per cent. moisture in order to operate successfully. The American investigators point out, however, that equally good results have been obtained with undried coal. Moreover, with such coal there is no loss due to unburned carbon monoxide in the flue gases, while the losses due to combustible matter in the refuse averaged only 0·3 per cent., which is less than the average with dry coal. The moisture in the coal must, of course, account for some loss, and this was shown to be at the rate of 0·1 per cent. for every 1 per cent. of increase of water present, the average decrease in boiler efficiency being about 0·7 per cent. with undried material.

As regards the extent to which the process of pulverizing is carried it is shown that completeness of combustion is a matter rather of proper furnace and burner design than of the fineness of the coal, although it would seem that if unduly large particles are employed the proportion of combustible matter lost in the refuse must necessarily be augmented. However, the American work refutes this point, and we are told that the loss from this cause is only 0·7 per cent. with the coarser particles as compared with 0·6 per cent. with the usual fine material, the average efficiencies being nearly the same. The subject, it will be agreed, has a good deal of significance, for the ability to use coarser coal means increased capacity of the pulverizing plant and, consequently, decreased cost of preparing the coal, while there should be less likelihood of danger.

A Leader of British Research

THE conferment on Sir Robert Hadfield by the American Society of Mechanical Engineers of the John Fritz medal is more than a personal compliment to a distinguished British metallurgist; it is, as the givers point out, an expression of the high regard and appreciation held in America "for what British engineers did in the war for the preservation of civilisation." The John Fritz Foundation, from which the medal takes its name, was formed in 1902 on the 80th birthday of John Fritz, the American engineer and metallurgist, who was practically responsible for the founding of the great Bethlehem Works. The medal is the highest honour in the gift of the engineering profession in the United States, and is only awarded or presented for scientific or industrial achievements of the greatest eminence. This medal adds another to a long list of awards made to Sir Robert Hadfield for his services to science and industry. From America he has received the John Scott medal and premium for the discovery and invention of manganese steel, and the Elliott-Cresson gold medal for distinguished leading and directing work in metallurgical science, both awarded by the Franklin Institute. We are so apt to take for granted our greatest achievements that it is pleasant to have this testimony from another country to the world's indebtedness to British science, and to the fact that our contemporary leaders include men worthy to rank with the greatest inventors and research workers of the past.

Some Instructive Reports

WE publish in this issue extracts from a number of State documents of much more than the ordinary official interest. The report of the National Physical Laboratory reviews in detail the progress of research in many branches of physical science, including metallurgy and metallurgical chemistry. If no results of revolutionary importance are disclosed, there is abundant evidence of quiet and sustained advance in detail, which, taken in the bulk, amounts to something substantial. The report of the Auditor-General throws some informing light on the results of State trading and administration during the war, and a detailed examination of the financial details will yield the student some useful knowledge respecting departmental finance and economics. Three reports are published on the effect of combination in the dye industries, containing some highly instructive figures on the effect on prices.

The Calendar

Aug. 6	North of England Institute of Mining and Mechanical Engineers: 2 p.m.	Newcastle-on-Tyne.
13	The Mining Institute of Scotland: General Meeting	Glasgow.
Sept. 7–4	British Association for the Advancement of Science, 89th Annual Meeting: "Some Aspects and Problems of Post-war Science, Pure and Applied," by Sir Edward Thorpe, the President	Edinburgh.
21–23	Institute of Metals: Annual Meeting	Birmingham.
28	Faraday Society: "Catalysis with Special Reference to Newer Theories of Chemical Action." General Discussion	—

Metallurgy and Metallurgical Chemistry

A Year's Work at the National Physical Laboratory

The report for the year 1920 of the National Physical Laboratory was issued last week by H.M. Stationery Office (5s. net). It supplies a very full review of the work done in the various departments—Physics, Electricity, Metrology, Engineering, Aerodynamics, and Metallurgy. The extracts printed below are taken from the report of Dr. Rosenhain (Superintendent of the Department of Metallurgy and Metallurgical Engineering).

Light Alloys

THE research work on light alloys has been continued energetically throughout the year. Much further work has been done on the constitution of certain of the groups of alloys concerned in the production of the more important light materials. In several cases detailed models of the consititution of ternary systems have been constructed, notably in regard to the ternary alloys of aluminium with copper and zinc and of aluminium with magnesium and silicon. In this connection the study of the constitution of the binary alloys of aluminium and magnesium has been completed. The equilibrium diagram which has been developed as the result of this research differs in several respects from those previously put forward, and represents a higher degree of accuracy in the study of this group of alloys.

The completion of the study of these groups of alloys has proved to be a matter of very much greater difficulty and occupying much more time than had been anticipated, so that complete publication of the results obtained has been delayed beyond expectation. A considerable amount of work has also been done on a study of the alloys of aluminium with copper and nickel. These continue to present difficulties of a very high order to all the ordinary methods of investigation. A series of new methods has been devised and tried in the hope that the characteristics of these alloys might be elucidated. Final success in this matter has not yet, however, been obtained. The knowledge of the constitution of this ternary system is of particular importance in connection with one of the alloys showing the greatest promise for practical use which has been developed in the Laboratory. This alloy exhibits a number of remarkable features, both in its mechanical behaviour and microstructure which urgently demand theoretical explanation. Until this explanation is obtained further development in the advantageous properties of this alloy can only take place by tentative and relatively slow steps.

In the Report for 1919 reference was made to the part played by magnesium and silicon in the form of a compound (Mg_2Si) in the age-hardening process in such alloys as duralumin and others containing magnesium. Considerable attention has been devoted to a closer study of the influence which the presence of copper exerts on these phenomena, and results of an interesting character have been obtained. The work is now approaching completion, and the results will, it is hoped, be available for publication shortly.

The whole study of the question of hardening as the result of quenching, either directly or after an ageing process, leads to the view that hardening is in every case the result of the temporary retention in solid solution of a substance which either in the cooling process itself, or subsequently during an ageing or tempering process, tends to separate out in the form of a very minute second constituent. This appears to be the case in carbon steel and also in the aluminium alloys whose hardening is here being investigated.

Casting Alloys

Attention has been devoted to the study of the effect of heat treatment on cast alloys, notably those containing magnesium as well as copper and nickel ($4/2/1\frac{1}{2}$). As a result, methods of heat treatment have been worked out which are capable of producing castings having a tensile strength as high as 19 to 20 tons per square inch in chill cast bars 1 inch in diameter. The density in this case does not exceed 2·85. The possibility of obtaining aluminium alloy castings having so high a degree of strength opens up a number of fields of useful application, both in connection with aeronautics and for industrial purposes. The application of aluminium alloy castings, for such purposes as car wheels and other parts of automobiles and railway rolling-stock in America, suggests that very considerable industrial possibilities may be opened up by the improvement of aluminium alloy castings. Work in this direction is still in progress and further interesting results may be anticipated.

The demand which exists in a number of cases for providing aluminium alloy articles, particularly castings, with a hard surface similar to that which is obtained in the case-hardening of steel, has led to a series of experiments intended to ascertain whether a process analogous to that of cementation in steel can be carried out in regard to aluminium alloys. An endeavour has accordingly been made to induce copper to diffuse inwards into an aluminium casting. It has been found that in certain conditions such diffusion can occur, at all events to a limited extent. The results obtained, although promising, have not yet reached the stage at which practical conclusions can be drawn.

Wrought Alloys

A large amount of work has been done on the further development of the various wrought alloys, including those previously described as "3/20," "high tensile," and "$4/2/1\frac{1}{2}$." In regard to the latter alloy particularly, the results already obtained appear to be so highly promising that it was thought desirable to explore the whole group of alloys lying in the neighbourhood of the composition already experimented with, in order to ascertain whether a modification of the composition would lead possibly to still better results than those already attained. A considerable number of alloys have accordingly been prepared, cast in the slab and forged and rolled. These have covered compositions ranging up to 7 per cent. of copper, 6 per cent. of nickel, and varying percentages of magnesium. The results obtained from these modifications have so far proved disappointing, but the exploration is not yet completed. In connexion with this particular alloy ($4/2/1\frac{1}{2}$), whose powers of resisting corrosion are of special importance, a considerable amount of work has been devoted to experiments in producing it in the form of very thin sheets which might be suitable for the wing covering of aeroplanes. Material has been successfully rolled down to a thickness of 0·006 inch in a width of 6 inches, and there is little doubt that with a suitable mill it could be rolled down to any desired degree of thinness and in reasonable width and ample length.

Considerable progress has been made with the production both of this alloy and of the other wrought alloys already mentioned, *i.e.*, "3/20" and "high tensile," on a commercial scale, principally at the Cardington Aircraft Works, now the Royal Airship Works, under the Air Ministry. Airship girders of standard design have been constructed and tested in all three alloys. A series of tests has also been carried out on struts made of these alloys in the form of channel sections 6 inches in length. These have given remarkable results, showing the very considerable advantage which the higher strength, particularly of the high tensile alloy, gives it over other materials when used in this form. Efforts have also been made to secure the manufacture and development of these alloys for commercial purposes, and it is hoped that industrial firms will take an interest in the future development of these material materials.

In connexion with these alloys, the question of protection from corrosion becomes of very considerable importance. A certain amount of work on this subject has been begun at the Laboratory, but the matter is being investigated elsewhere, mainly in connexion with the Panel of the British Engineering Standards Association dealing with Protective Varnishes for Aircraft Alloys.

British Engineering Standards

During the year Sub-Committees and Panels of the British Engineering Standards Association have been formed for the purpose of issuing standard aircraft specifications for aluminium alloys, and it is hoped to include the new alloys developed

in this Department in the list of standard materials to be specified. One matter arising out of the effort to prepare standard specifications, relates particularly to a bend test which shall be suitable for discriminating between sheet alloys of this kind when in a satisfactory and when in an unsatisfactory condition in regard to ductility. Investigations carried out at the Laboratory soon showed that most of the ordinary bend tests were unsatisfactory when applied particularly to the hardened alloys of this kind, duralumin, "HT," and "4/2/1½." Two special types of bend-testing machine have therefore been developed, one by Mr. Jakeman of the Engineering Department of the Laboratory and the other by Mr. C. B. Marryat of this Department. The latter machine is particularly satisfactory from the point of view that the reverse bending of the strip of sheet metal takes place accurately along the same line, so that there is not the formation of a region of double curvature which usually occurs in bend-testing appliances. The results obtained with a large number of specimens of the harder aluminium alloys, however, suggest that it will not be satisfactory to use alternate bending tests on these materials, and that it will be preferable to confine a bend test to the measurement of an angle through which a specimen of the alloy can be bent around a given radius, using a single bend only. The results obtained have been submitted to the Panels and Sub-Committees of the British Engineering Standards Association and are likely to form the basis upon which standard specifications will be drafted.

Another matter arising from the same source relates to what is known as the proof load. This quantity is now substituted for the older term "yield point" in the case of alloys where no definite yielding is shown in the testing machine. The quantity is specified in such a way that a specimen of the alloy exposed to a tensile stress of a definite amount, shall not, after the removal of the stress, show an elongation greater than one-half of 1 per cent. of the gauge length measured, the latter being usually 2 in. An extensive series of careful measurements of the stresses at which samples of various aluminium alloys show an extension of one-half of 1 per cent. on a length of 2 in. have been carried out. A series of interesting and very consistent results have been obtained, and these have been submitted to the British Engineering Standards Association Panels and Sub-Committees. They are in good agreement with the results obtained by other investigators, and will serve as a satisfactory basis for standard specifications.

Season Cracking

Further study has been devoted to the question of the conditions under which certain aluminium alloys are liable to undergo cracking under the influence of prolonged exposure to stress ("season cracking"). The conditions under which the alloys are particularly liable to this form of failure had already been well ascertained, but special attention has now been given to a further investigation of the methods of manufacture and treatment which can be relied upon to produce material free from this defect. This has mainly taken the direction of endeavouring to avoid exposure of the alloys, after once rolling, to any temperature high enough to produce the over-annealed condition in which such cracking is likely to occur. This is of particular importance in connection with the heat treatment (quenching) of alloys containing zinc and magnesium. The results obtained indicate a series of conditions in which the alloys can be obtained quite free from any risk of cracking of this kind. On the other hand, further investigation is still required, and is in progress, with a view to obtaining the alloys in the highest condition of strength and hardness while still immune from risk of failure.

Age Hardening

In connexion with the remarkable phenomena of age hardening which are met with in a whole group of aluminium alloys containing magnesium, &c., the question has arisen whether or not the gradual hardening which occurs in the course of four or five days after quenching is accompanied by any change of volume or dimensions, and if so, at what stage a constant volume or dimension is reached. The fact that alloys like duralumin "HT" and "4/2/1½" are liable to undergo a serious amount of warping as the result of quenching and ageing, suggests that changes of dimensions do occur to a serious extent. A series of specimens of various alloys, suitable for accurate end measurement, has been prepared and submitted to the Metrology Department of the Laboratory for measurement. The results obtained indicate that there are certain changes of dimensions, although changes of volume could not be ascertained by the methods used. These changes are small and are comparable with the errors of experiment in the method of measuring which has been used. Further work, particularly of a volumetric character, is being carried out in order to clear up this matter.

The work described above in connexion with light alloys research, together with the preparation for publication of a series of papers and of the report to the Alloys Research Committee which is now approaching completion, has occupied the time of the staff so fully that it has not been possible to touch a number of other problems demanding attention and indicated in previous reports and programmes. It is hoped that as current work is completed these problems will receive attention in turn.

Iron and Steel

The work which has for a long time been carried out by this Department, in the investigation of cases of failure and defects occurring in steel, has brought into prominence a number of problems of a fundamental character in connexion with steel which require investigation. One of the matters in question relates to the temperature at which steels of various carbon content begin to melt when heated. An exact knowledge of the temperature of incipient fusion or of final solidification ("solidus") of the iron-carbon alloys is of fundamental importance in regard to many problems arising both in the course of investigations in the Laboratory and in works practice. An opportunity for commencing an investigation on this subject, on lines more likely to lead to satisfactory results than those formerly attempted elsewhere, presented itself when a Japanese metallurgist (Mr. Asahara) obtained permission to work in this Department for some months. Mr. Asahara carried out a large amount of preliminary work in the preparation of pure iron-carbon specimens and in examining their behaviour when heated to various temperatures in the electric furnaces available for that purpose. The difficulties in securing complete homogeneity of the sample and in preventing the loss of carbon during the prolonged heating necessary to secure a satisfactory state of equilibrium proved to be very much greater than had been anticipated. The work has, however, been carried far enough to show the manner in which these difficulties can be overcome. Since Mr. Asahara's departure the work has been continued, a modification of the graphite ring furnace, however, being necessary to ensure the desired condition.

Physical Structure of Metals

The investigations on a very wide range of metals and alloys which have been carried out in the Department in recent years have raised a number of problems which require for their elucidation a better understanding of the internal structure and constitution of metals in general, and of their behaviour under various kinds of treatment, thermal and mechanical. Various hypotheses intended to account for the multifarious phenomena observed have been put forward and studied. Among these the conception of Beilby, that metal may exist in certain circumstances in an amorphous or vitreous form, has proved most fruitful and useful. An extension of this conception by the hypothesis that an amorphous layer may exist between the crystals of a metal, even in the fully annealed condition, has also proved of very wide utility and interest. The extent to which these ideas enter into the understanding of a very large range of phenomena, however, makes it of fundamental importance that all possible means of obtaining experimental evidence bearing upon them should be accurately pursued. The investigations on "season cracking," referred to above, have a very important bearing upon this matter. In addition, however, special researches directed towards the study of these questions have been begun and others are in contemplation.

One of the researches in question relates to an effort to determine the quantity of heat generated in relation to the work done in mechanical deformation of metal. Experiments are in hand for determining the quantity of heat generated in the compression of a pure metal sample by a known amount. The work has not, however, been carried sufficiently far as yet to yield any results.

Metallurgical Chemistry

The later portion of the period under review has shown a very considerable increase in the amount of work of this kind submitted to the Laboratory by the India Office and other Government Departments. Further work has been done in the direction of accelerating and improving the methods of analysis employed. The cause of some variations in the volumetric determination of sulphur in steel has been particularly studied by Mr. Rooney, and interesting results have been obtained, which it is hoped shortly to publish. Miss Nottage has carried out a research on the estimation of phosphorus in the presence of tungsten in steels ; a method has been worked out which promises to overcome the well-known difficulty caused by the presence of that metal.

Standardised Steel Samples

Considerable progress has been made with the preparation of analytically standardised steel samples in conjunction with No. 5 Research Committee of the Iron & Steel Institute. Some five batches of standard steel ingots, or billets, have been received from the makers, after careful analytical examination and acceptance as sufficiently uniform, both by the Laboratory and by the District Authority acting on behalf of the Iron & Steel Institute. Three of these standards have now been machined and a sufficient quantity of fine millings suitable for analytical samples have been obtained and carefully mixed. Samples of these millings have been sent to the co-operating analysts throughout the various steel-making districts, and their results are now being received and compared with those obtained at the Laboratory. It is gratifying to find that in the majority of cases excellent agreement is being arrived at. It is hoped that analytically standardised samples will be available for public issue in a few months' time.

General Chemistry

A large amount of miscellaneous analytical work, required in connexion with tests and researches in other divisions of this Department and elsewhere in the Laboratory, has been carried out. This has included analytical work on some special bricks submitted by the Ministry of Health in connexion with housing schemes, and also firebricks and crucibles, as well as heat-insulating materials. Special analytical work of considerable difficulty has also been carried out in connexion with the production of wires of special alloys for electrical resistance use (manganin type), where it was required to determine small differences of chemical composition in the exterior and interior portions of a comparatively fine wire before and after thermal and other treatment. Some work has also been done in studying various processes proposed for depositing protective coatings on metallic mirrors intended for use in searchlight projectors.

Optical Glass Research

The work of this Division has suffered materially from the fact that Mr. E. A. Coad Pryor resigned his post from July 1. None the less, considerable progress has been made, and the furnaces and appliances which have been developed, as described in previous reports, have worked in a satisfactory manner throughout the year. Further improvements have been made in the electrical furnaces, and a new 5-in. graphite ring furnace has been constructed for use at high temperatures, particularly in regard to the testing of refractories in connexion with optical glass making. In this furnace such properties as "squatting point," firing shrinkage, porosity, &c., can be examined. In connexion with these furnaces a special type of vertical muffle has been constructed in the Department. This is made of a mixture of very refractory clay, kaolin and alumina, in suitable proportions. These are so adjusted that the material of the muffle begins to vitrify at the temperature at which the muffle is intended to be used. In this way a sufficient degree of gas-tightness is secured to maintain any desired atmosphere within the muffle, even when used in a carbon-electric furnace which has a strongly reducing atmosphere outside the muffle. These muffles have proved extremely useful, not only in the work of this division itself, but also in facilitating the production of carbon-free metals and alloys in other sections of the Department.

The investigation of the mechanism of pot-attack has been carried further. In the first instance, it was desired to extend the experimental evidence as to the character of pot-attack and as to the part played by currents set up owing to changes of density arising from solutions of pot material, to larger sizes of pots. For this purpose the experiments were transferred from the small electric ring furnace to the large melting furnace of the Department. The behaviour of the refractories in this larger furnace proved to differ very considerably from that found in the small electric furnace. The cause of this difference has since been traced conclusively to the fact that the temperature distribution in the large furnace is very much more uniform than in the small electric furnace in which the first series of experiments were carried out. The conclusion has been arrived at that convection currents due to temperature differences between the top and bottom of the pot of glass play a very important part in the whole phenomenon, and that they may under certain circumstances competely disguise the effect due to changes of density arising from solution of the pot material. The formation of vigorous convection currents in a pot of molten glass is obviously favoured by having the lower part of the pot at a higher temperature than the upper part. On the contrary, by maintaining the upper part of the pot at a higher temperature than the lower, the occurrence of vigorous convection currents can be very much reduced or prevented. It would thus seem that, in order to minimise pot attack, it would be well worth while to secure in industrial furnaces the maintenance of a higher temperature at the top than at the bottom of the pot. During melting there would probably be some difficulty in carrying out the operations in this manner, but during the later stages there would be no disadvantage in the arrangement of temperature indicated.

The further experimental work which has now been done in connexion with pot-attack indicates that it is very desirable that measurements should be made upon the walls of the pot and not merely upon a completely imm rsed rod, since it appears that there may be some difference in the precise mode of attack which occurs on pot walls which are exposed to molten glass on one side only and on the surface of the rod which is completely immersed. Experiments in this direction are being undertaken.

Aeronautical Chemistry

The work mentioned in last year's report, on the effects of different solvent mixtures on the physical properties of solutions of cellulose acetate, has been supplemented by measurements of the properties of the solvents concerned, in order to determine whether the curious differences due to the addition of alcohol and benzene to acetone solutions were in any way related to the properties of the mixed solvents themselves. No simple relation between the change in viscosity of the solution and any property of the solvents has been revealed, so that the effects would appear to be specific. It is accordingly proposed to extend the original observations to other concentrations and to other types of acetate, in order to find what reduction is possible in the high viscosity of dopes by suitable combination of solvents. The very viscous nature of these solutions is at present a bar to the use of solutions more concentrated than some 8 per cent., entailing a large waste of solvent in the application of the dope to the wings of aeroplanes, and, what is probably more important, precludes the employment of cellulose acetates giving exceptionally viscous solutions ; such acetates yield stronger and more permanent films, and if they could be used in dopes would almost certainly increase the life of the wings.

The differences between various acetates of cellulose cannot at present be related to their chemical constitution. It is desirable both for theoretical and for practical reasons to be able to make accurate analyses of these products, but the existing methods are not readily reproduced. A research on the method of saponification of cellulose acetate which had reached the stage of allowing reproducible results to be obtained for some acetates, has been interrupted by the illness and subsequent retirement of Miss Wilson, who was in charge of the experiments. The variation of the viscosity during the reaction should indicate the extent of homogeneity of the product examined, and might give data which would elucidate the differences in physical properties between acetates having practically the same acetyl content, which is one of the chief hindrances to an understanding of their nature. It is proposed to complete this work, since it will at all events provide an analytical method of some accuracy for the characterisation of these substances, and it may afford very useful theoretical informa-

tion. A determination of the molecular complexity of the acetates in different solvents is in hand; it should be possible by this means to correlate the viscosity roughly with the molecular weight, and perhaps to understand why a product soluble in chloroform and insoluble in acetone has these solubilities reversed on hydrolysis so partial that it can hardly be detected by saponification. The method which is being used is the microscopic vapour pressure method devised by Barger.

A paper on the suitability of glycerol as a standard in the viscometry of viscous solutions such as dopes, which answers another request, has been sent to the Aeronautical Research Committee. It was found that commercially pure samples of glycerol showed considerable variation in viscosity, even when their specific gravities had been adjusted to be identical. Certain chemical tests were devised, which ensure sufficient reproducibility to enable approved samples to be used by different workers to obtain concordant results in the examination of cellulose acetate or other viscous solutions. Work is still in progress on the provision of a simple and convenient test for comparing doped fabrics as to facility of ignition; this test is required in the specification of doping schemes.

Reviews

MODERN CHEMISTRY, PURE AND APPLIED. By Arthur J. Hale, B.Sc., F.I.C. London: Virtue & Company. Vol. I. pp. 272, Vol. II. pp. 276. 16s. net per volume.

Mr. Hale's work is eventually to consist of six volumes, two of which have already appeared. The whole series is intended to form a complete compendium of chemical knowledge, covering mining, metallurgical, organic, pharmaceutical, and industrial chemistry. So far as the production of the work is concerned no expense seems to have been spared in the endeavour to make everything of a first-class order, the printing is large, the paper of excellent quality, and the illustrations are not only numerous but exceedingly clear and informative. As to the material itself and the public to which it will appeal, it is fairly obvious that the author has treated his subject somewhat in popular style. Rather than being a book for the use of research chemists and those engaged on the more abstruse chemical problems, it is one which should mainly make an appeal to the student who has completed his pure chemical studies, and is anxious to obtain a general insight into the everyday applications of chemical science. This is not intended to imply that the book is not thorough, for it may claim to be as complete a résumé as any individual author can ever hope to compile. It does not, of course, bear comparison with Thorpe's dictionary, nor is it intended to do so.

The first volume deals mainly with the composition of air and water, the standard gas laws and the kinetic theory. There is a particularly concise and well-illustrated description of the methods employed for the liquefaction of oxygen, hydrogen, and nitrogen, while the author has touched upon subjects which are frequently neglected, such as the industrial applications of ozone. One finds, too, a very readable and not too involved description of the methods of recovering atmospheric nitrogen and the oxidation of ammonia. Necessarily, the information is of a decidedly general character; but the author shows the merit of appreciating this by reason of the fact that he gives references to guide those of his readers who wish to pursue the subject further. It must be admitted that the specialist in any particular branch of industrial chemistry will in some instances find the information dealing with that branch decidedly sketchy and frequently a little antique. For example, on page 249 there is an illustration which purports to give an idea of the operations conducted at a gasworks, but probably Murdoch himself would not have recognised it. Volume II. deals, among many other subjects, with the alkali industry, the potash industry, the rare earths and their industrial uses. This volume, again, is profusely illustrated with diagrams and half-tones which are particularly helpful in simplifying otherwise involved descriptions. The main difficulty with the two volumes which have so far appeared is that of finding any particular information they contain. It is unfortunate that the author has not appreciated the value of providing a separate index to each volume, and it is to be trusted that the omission will be remedied as far as possible by the inclusion of a really comprehensive index when the final volume is published. C. A.

CRITICAL MICROSCOPY, by Alfred C. Coles, M.D., D.Sc., M.R.C.P., Lond., F.R.S. Edin. (London: J. & A. Churchill.) Pp 104. 7s. 6d. net.

This admirable little brochure of some 100 pages, describes in a very interesting and simple manner how to get the best out of the miscroscope. It is not intended as a text-book on the subject, of which there are several excellent works already available, but it sets out to describe in a simple and practical manner the optical principles involved and how to use this knowledge so as to secure at all times the keenest possible definition and the highest obtainable resolving power.

It is not generally realised what an immense influence the careful control of the illumination has on the character of the image seen through the miscroscope, especially when high magnifications are employed. The average worker is apt to pay scant attention to the source of light used, with the result that not only are the observations made more difficult but continued use has an injurious effect on the sight and there is no doubt that many who constantly use the microscope suffer needlessly in this respect through ignorance or neglect of a few simple precautions. The author shows how by the use of an artificial light, preferably an oil lamp, permanently mounted at the correct distance from the mirror and shaded so that no direct light reaches the eyes, an almost indefinite number of observations can be made, day after day, without any injurious action and with scarcely any fatigue.

Another important matter which is very often overlooked is the correction necessary when using different objectives so as to obtain the optimum defining power. This correction can either be obtained by an adjustment of a collar provided on many of the objectives or by an alteration in the length of the body tube of the microscope. As many objectives do not possess a correction collar it is usually necessary to adjust the length of the body tube, and practically all modern instruments are provided with a sliding tube worked by rack and pinion on which the tube length is marked in millimetres.

The author, besides possessing a long and varied experience in the use of the microscope, is obviously also an enthusiast on the subject, and the book is full of extremely useful hints not only on the manipulation of the instrument and the selection of suitable objectives and eye pieces, but as regards the many ingenious and useful accessories which are now available.

We confidently recommend the careful perusal of this excellent little work to all who use the microscope either for routine or research work, or as a hobby. P. J. F.

Industrial Week Ends

THE Industrial League and Council is arranging as in previous years a number of week-end conferences, and the first of these took place on Saturday and Sunday, the 25th and 26th of June, at Blunt House, Oxted, the residence of Mr. and Mrs. Ernest Benn. "Trade unionism and the community" was the subject of discussion opened by Mr. F. S. Button, of the Industrial Court. Among those who attended were: Sir George Paish, Sir Ernest Clarke, Mr. G. E. Roberts (president of the National City Bank, New York), Mr. W. J. Richardson (the Barlock Typewriter Co.), Mr. A. R. Stelling, Mr. W. T. Kelly (the Workers' Union), Mr. T. E. Naylor (London Society of Compositors), Councillor Jackson (National Union of Railwaymen), Councillor Weaver (General Workers' Union), and others. Four sessions were held on Saturday evening and during Sunday.

The Industrial League and Council is anxious to extend this week-end Conference movement which, for three years now, has proved its value. The more opportunities thus open for leaders of thought on both sides of the industrial controversy to come together and get to know one another, and thoroughly to investigate each other's point of view, the greater the prospect of that mutual understanding upon which all hopes of industrial peace rest. Mr. John Ames, general secretary of the Industrial League and Council, 82, Victoria Street, S.W.1., would be glad to receive offers from owners of country houses who would be willing to act as hosts in this connexion.

An outbreak of FIRE on June 25, in a shed at the works of the Scottish By-Products, Ltd., Grangemouth, resulted in damage to a quantity of chemicals.

Government's War Time Experiments in Trade

Auditor-General's Report on Financial Aspects

In the new report of the Comptroller and Auditor-General on the services undertaken during the war in connexion with war materials and food supplies some interesting information is given as to the financial aspects of Government trading (Cmd. 1,368, 3s. 6d.). The following extracts are taken from the volume; for the detailed figures readers are referred to the financial tables.

British Farina Mills, Ltd.

REFERENCE was made in paragraph 99 of my report on the Vote of Credit Appropriation Account last year to an agreement dated April 23, 1918, under which large advances were made by the Ministry of Food to the British Farina Mills, Ltd., for the acquisition and equipment of four mills with the object of manufacturing farina in this country. In order, apparently, to avoid litigation and further payments to the company on account of costs of production after January 31, 1920, a final settlement was effected with the Company on December 6, 1920. By this settlement the whole of the subscribed shares of the company (£25,000) were transferred to the Food Controller, and the company was placed in voluntary liquidation. The realisation of the assets was placed in the hands of two liquidators who were empowered to clear the company's bank overdraft and all other liabilities of the company to creditors other than the Food Controller.

The total payments made by the Ministry of Food to, or on behalf of, the company before the settlement of December 6, 1920, were as follows: Capital advances on debentures, £322,573 13s. 6d.; cost of production (net), £130,959 12s. 11d.

The payments, on account of liquidation, made since December 6, 1920, are: To shareholders, for capital issued, £25,000; to shareholders, for interest, £66 3s. 5d.; bank overdraft, £22,949 19s. 1d.; liquidators' account, £4,000; the aggregate amount charged to public funds being over £500,000.

In reply to inquiry as to any further liabilities and as to the value of assets, I am informed that any further payments will be in the nature of a refund when the whole of the assets have been sold, and that, on a conservative basis, it is estimated that the gross realisation of the whole of the assets of the company will not exceed £70,000.

In connexion with the scheme of farina manufacture, the Ministry, at the end of 1917, established on their own account an experimental factory at Lincoln, upon which upwards of £18,000 was expended on plant, buildings, vegetables, &c. The factory produced only 2 tons of farina, which realised some £70. In regard to the disposal of the assets, it appears that a portion of the plant and machinery was retained by the owner of the mill in part payment of reinstatement charges, and that the remainder was handed over to the Disposals Board. The amount realised for the portion sold was £607, and plant of the purchase price of about £3,000 still remains unsold.

Royal Naval Cordite Factory

In paragraph 20 of my Report on Navy Stores, 1918-19, I referred to the question of the restarting of the acetone plant at Holton Heath. I have recently made further inquiry on the subject, and am informed that the plant is being used for industrial experimental work, and that there are possibilities that it will be of further use for Naval purposes.

Chalk-Grinding Plant

With the object of meeting a need for crushed chalk for agricultural purposes, contracts were made in 1918 with two firms of lime merchants under which the Ministry supplied and installed the necessary plant, and the firms undertook to sell the crushed chalk at a fixed price and to pay the Ministry a royalty of 2s. 6d. a ton on all chalk passed through the crusher. The contracts also gave the firms the option of taking over the plant at a valuation at some future date. Since the close of the period of the present account the plant at Coulsdon, Surrey, has been purchased by Messrs. Hall & Co.

Sprayers and Spraying Material

Arrangements were made in the summer of 1917, and continued during subsequent years, for the more general spraying of potatoes, by the provision of apparatus and materials, and by propaganda. Knapsack sprayers and chemicals were supplied through the Committees and the area of potatoes sprayed was 30,000 acres, but inasmuch as many purchasers of machines obtained their chemicals locally, the total area of potatoes under small cultivation which was sprayed is in excess of that figure. Provision also was made for spraying potato crops on large farms, for which purpose a total of 112 horse-drawn machines was placed under the control of the Committees.

In response to a demand for potato sprayers in Scotland the Board made arrangements with the Food Production Department of the Board of Agriculture and Fisheries, which Department controlled the only available supply of the machines, to supply a sufficient number of sprayers to the Board's order in Scotland. The distribution of these was undertaken, on behalf of the Board, by two agents, one in Edinburgh and one in Glasgow. Scottish applicants were charged 2s. 6d. per sprayer more than in England and Wales, this additional charge being made to cover the extra cost of carriage and handling by the agents.

Fertilisers

The account is a composite one covering transactions in pyrites and superphosphates, sulphate of ammonia, and sulphuric acid. The object of the scheme was the production of adequate supplies of fertilisers for agricultural purposes, and of adequate supplies of acids for manufacture of high explosives and propellants.

Originally, no loss on the schemes was anticipated, but low prices of issue for superphosphates were fixed by the Government, and, in addition, the losses shown include subsidies given in production of sulphate of ammonia and assistance given to acid works.

Superphosphates

This transaction was undertaken early in 1917 when there was a serious shortage of superphosphates, which was urgently required for immediate application to the crops. Two cargoes were imported from Portugal and one from Algeria for resale to farmers. It was recognised at the time that a loss on the transaction was unavoidable, as the current price in this country, based on the cost of phosphate rock imported under old contracts in the previous year, was considered below the price then ruling abroad after allowing for freight. It was considered inexpedient to offer the superphosphate for sale merely to the highest bidder, owing to the risk of its being held for a rise until the following season, and the object of the Department being thereby defeated. It was, therefore, offered to groups of merchants at a price which allowed of its being sold to farmers at the current market price. The net loss of £28,759 was, however, considerably heavier than had been anticipated, owing to rates of freight being finally fixed by the Ministry of Shipping at a much higher figure than was originally allowed for. Other and later superphosphate transactions were controlled by the Ministry of Munitions.

Muriate of Potash

The arrangements made for the purchase and sale of muriate of potash were part of the general programme of the Food Production Department of the Ministry for ensuring a sufficient supply of agricultural requisites during the war. They were made in the early part of 1918 in conjunction with the Ministry of Munitions and under the scheme then agreed upon, the muriate of potash manufactured at the Oldbury Factory of the British Potash Company was taken over by the Ministry of Agriculture and sold to agriculturists. The whole of the potash was ultimately disposed of to agriculturists and the transactions resulted in a net profit of £3,816 11s. 2d.

During the spring of 1919 the amount of muriate of potash available for fertilising purposes was limited, and the Board undertook the work of distribution in Scotland in order to ensure an equitable allocation of the material among farmers and others. Prices were arranged which provided for the payment of commission to the distributing agents and left the Board a margin of profit.

Boring for Oil

The balance sheet shows the position as at March 31, 1920, in respect of operations undertaken by Messrs. S. Pearson & Sons, Ltd., under the terms of an agreement dated September, 1918, in prospecting for oil in the United Kingdom. The expenditure was limited to £1,000,000, and the account shows outlay on works, plant, and preliminary expenses.

Spelter

Under an agreement entered into in April, 1917, with an association of Australian producers, His Majesty's Government undertook to purchase such quantities, not exceeding 45,000 tons of spelter and/or refined zinc in any year in which the association shall be in a position to supply for a period of 10 years from January 1, 1918. Up to March 31, 1920 payments amounting to £33,367 7s. 7d. were made for spelter and sales to the value of £5,761 17s. 4d. were made by the Ministry of Munitions acting as agents of the Board of Trade. Stocks unsold to the value of £26,207 5s. 10d. were on that date held by the Ministry, who had, however, remitted that sum to the Board in advance of sales. Interest on net advances has been debited to the account. No administrative expenses have been incurred. The loss of £1,705 7s. is due—(*a*) to fall in the price of spelter, (*b*) to the inclusion of interest on advances.

Potash Supplies

Under an agreement dated March 17, 1919, the German Government undertook to supply the British Government with certain quantities of potash salts in exchange for equivalent supplies of foodstuffs. The Board of Trade entered into an agreement to sell the potash to the British Potash Co., Ltd., at certain fixed rates for re-sale to consumers. After deducting selling and administrative expenses, a proportion of the net profit is to be paid to the Board. The accounts to March 31, 1920, are merely provisional, as they record only the purchases during the year and the sales to the British Potash Co., Ltd. The re-sale by the British Potash Co., Ltd., will be reflected in the accounts when that firm render their account sales, which will be audited by a joint auditor appointed by the Board and approved by the Company.

The disbursements to March 31, 1920, amounted to £678,010 12s. 10d., while the sales to the British Potash Co., Ltd., were valued at £322,987 17s. 5d. The stocks in hand overseas or in transit at the date were £355,022 15s. 5d. The account has been debited with the sum to represent interest on Treasury advances, but the administrative expenses will not be reflected therein until the account sales is received from the British Potash Co., Ltd.

British Dyeing and Dyestuffs Industries

Report of Profiteering Act Sub-Committees

During the past week Sub-Committees appointed by the Standing Committee on the Investigation of Prices and on Trusts have issued reports on Dyeing and Cleaning [Cmd. 1361]; Dyeing, Finishing, Bleaching and Printing [Cmd. 1371] and Dyes and Dyestuffs [Cmd. 1370]. The substance of their findings and conclusions is given below.

Dyes and Dyestuffs

THE Sub-Committee on Dyes and Dyestuffs state in their report that they have held 22 meetings and have taken evidence from representatives of the Board of Trade, of the principal dye manufacturers in this country, of representative consumers, and of associations interested in dyes and dyestuffs. "We have," they state, "obtained information in regard to the development of the dye manufacturing industry, the position of the industry immediately prior to the war, the demands on the industry occasioned by the war, the considerations which led to promotion under Government auspices and with Government aid of a large dye-making enterprise, and the considerations which led to the promotion of a combination between that concern and a privately-owned dye-making concern; and we have inquired into the effect of that combination upon supplies, prices and costs, so far as these effects have become manifest."

The Sub-Committee's conclusions are as follows:—

1. There exists in the dyes and dyestuffs industry a trade combination, the British Dyestuffs Corporation, Ltd., which comprises what was formerly British Dyes, Ltd., and Levinstein, Ltd., and which has a productive capacity equal to about 75 per cent. of the total productive capacity of the country in dyes and dyestuffs.

2. Although it subsequently transpired that other concerns, without State aid or participation, were able to develop their dyes production at a rate comparable with that of British Dyes, Ltd., we are of opinion that the action taken by the Government in promoting and subscribing to British Dyes, Ltd., was, in the circumstances of the time, well-advised and sound.

3. The amalgamation of British Dyes, Ltd., with Levinstein, Ltd., into a single large concern, the British Dyestuffs Corporation, Ltd., was, all things considered, in the best interests of the industry, its customers, and the nation.

4. The conversion of shares in Levinstein, Ltd., and British Dyes, Ltd., into shares in the British Dyestuffs Corporation, Ltd., was effected on an equitable accountancy basis, and was not unduly favourable to either of the amalgamating concerns.

5. The British Dyestuffs, Corporation, Ltd., in view of its predominant position in the industry, might, if it so endeavoured, in favourable conditions, come to be in a position to exercise a monopolistic influence over the supply of dyes and dyestuffs in this country.

6. The "safeguarding" clauses in the articles of association, together with the powers of veto held by the Government directors, provide against unreasonable prices or inequitable distribution of products, and the combination of interests represented on the directorate provides more fully than would be the case were the corporation an ordinary joint-stock concern against the use of monopolistic power to enforce prices yielding unreasonable profits.

7. We do not consider that the corporation is under the handicap of over-capitalisation, except in so far as the buildings, plant, &c., of the British Dyestuffs Corporation, Ltd., were erected at a time of high prices and feverish conditions, and in so far as they may prove more than adequate to the demands which will be made upon them.

8. It is to be regretted that the additional capital required at the formation of the British Dyestuffs Corporation, Ltd., could not be raised from among dye users, and that, in consequence, it should have been necessary to go to the public for one half of the share capital.

9. The dividends paid by the associated concerns prior to amalgamation were not unduly large; the very considerable profits made in the war period were for the most part devoted to extensions and developments and writings off of capital expenditure. The profits made since the amalgamation have not, for a variety of unforeseeable causes, borne out the expectations held out in the corporation's original prospectus.

10. The amalgamation of the two concerns holds the promise of economies in management costs, overhead charges and selling expenses; of increased efficiency due to large-scale production and unified buying; and of general advantages in the shape of pooled knowledge and experience, centralised research, better use of by-products, and greater financial and commercial competing strength. Some of these advantages have been realised.

11. The success which has attended the operations of several independent dye-making concerns suggests that the advantages of centralisation may easily be exaggerated. The separate existence of these concerns affords a salutary check on the corporation's costs of production and a safeguard against abuse of monopoly. A policy of absorption which would result in only a negligible proportion of the industry being left outside the corporation would be undesirable.

12. The price of dyes at July, 1920, and March, 1921, according to the records of the representative consumers, showed increases over the pre-war prices as set out in Schedule II.

13. These increases are accounted for in some part by increases in the cost of materials, fuel, labour, repairs, and renewals, but the main cause of the high prices is to be found in the fact that at the outbreak of war the dye-making equipment of this country was equal to supplying only 10 per cent. of its dyes requirements and prices tended to rise to famine levels, dye manufacturers could have obtained for their products far higher prices than those at which they did in fact sell. In addition, the high cost of manufacturing intermediate products directly affected the prices of all dyes and dyestuffs.

14. The prices charged by dye manufacturers during the war were higher than were justifiable on the basis of current costs of production. In some cases the profits were not distributed in the form of dividends but kept in the business in the form of extensions and developments of the works. In the case of the firms whose works were acquired by the corporation, the shareholders had the advantage of these profits, because these extensions formed part of the assets for which value was received on their acquisition by the corporation.

15. If the dyes industry is to be regarded henceforth as a part of the military preparations of the various nations the competition in dye making will assume a character akin to that of the competition in armaments, the productive capacity of the world in dyes and dyestuffs will increase out of all proportion to the world's requirements, and the dyes industries of the various countries will undoubtedly claim State subsidies.

16. During and since the war the dye-making concerns of Germany, the United States and Switzerland have become merged or linked into great combinations.

17. The giant concern is not necessarily more efficient, enterprising, or economical in each separate department of its manufacturing operations than the smaller inter-competing concerns; but, inasmuch as international competition in dyes has become a matter not merely of producing the most acceptable article at the most favourable price, but also a contest in which massed commercial and financial power plays a great part, we are inclined to the opinion that the policy represented by the formation of the British Dyestuffs Corporation, Ltd., was and is a right one.

18. Further developments of the policy of combination in the dyes industry should, if called for, take the shape of alliances with concerns supplying the principal materials used in dye manufacture. Such a development would not be objectionable provided the representative character of the directorate is maintained and provided control over materials is not used to prejudice other dye-making concerns.

19. Nothing should be allowed to enter into the constitution or practices of the British Dyestuffs Corporation, Ltd., which would enable it to prejudice or disable the competing power of other British manufacturers of dyes, nor should it be accorded preferential treatment. The freedom of the corporation, however, to meet any action on the part of other manufacturers which would be contrary to the interests of the consumer should not be hampered.

20. In order to secure co-ordination of production, pooling of research, and its results, and the pursuance of a common policy, there should either be constituted an association of dye manufacturers or the consultative and advisory council proposed under the Dyestuffs (Import Regulation) Act should be developed in this direction. It should be an essential part of public policy to require any such association or council to acquaint home buyers of their products, through the medium of their trade associations, with the nature and terms of any and all agreements or understandings between the manufacturers concerning prices or affecting equitableness of distribution.

A minority report is appended, in which Major H. Barnes, M.P., dissents from the majority of the conclusions of the rest of the sub-committee.

Dyeing and Cleaning

THE report of the Sub-committee on Dyeing and Cleaning states that, although they have no evidence indicating that the associations in this trade have intended to raise prices against the public, they consider that the future activities of this in common with other trade associations or combinations should be subject to some form of surveillance on the part of the Board of Trade in the interest of the public as a whole.

The report contains two interesting appendices showing the increased percentage cost of dyes and chemicals in 1920 and 1914. The percentages as shown in the report are given below:—

Alphonal brown, 300; acid scarlet, 664; acid violet, 6 BN, 653; acid violet, 4 BN, 433; acid black, 490; acid orange, 694; acid yellow, 433; acid fast blue, 564; acid green, 409; acid magenta, 531; auramine, 200; azoflavine, 253; Bismarck brown, 396; benzo fast violet, 102; benzo dark green, 550; benzo dark brown, 197; benzopurpurine, 4 B, 638; Congo red, 73; Congo rubine, 482; chrysophinine, 590; cotton brown, 190; cotton violet, 457; cotton black, 693; carbide black, 800; Coomassie black, 153; chlorazol black, 344; chlorazol blue, 620; chlorazol brown, 210; chloramine sky-blue, 626; cyonal substitute, 434; direct red, 454; direct orange, 514; direct brown, 286; direct yellow, 555; direct blue RW., 584; direct black B.H., 828; direct cotton black BX, 471; direct violet 2B, 345; direct green, 586; diamine violet, 94; diamine scarlet, 173; diamine green, 414; diamine fast yellow, 330; diamine dark green, 386; diamine steel blue, 193; diamine blue BK, 188; diamine brown, 300; diamine sky-blue, 600; dyazo black, 760; dional brown, 226; formyl blue, 391; formyl violet, 490; gloria black, 774; indigo extract, 297; hematine crystals, 299; Hessian purple, 941; melanthyrine, 1,025; methyline blue, 575; methyl violet, 1,232; malachite green, 475; orange II, 825; oxyphenine, 667; naphthalamine black, 752; neutral navy, 479; phenyl light blue, 455; rhodamine, 1,600; sulphoncyanine 3R, 584; trional green, 200; union green, 350; union black, 435; union brown, 344; union blue, 397; union violet, 247; wool green, 232; wool blue, 435; xylone blue 707; vitriol, 193; sodium peroxide, 125; hydrogen, 254; acetic acid, 453; oxalic acid, 1,040; muriatic acid, 100; ammonia, 164; and nitric acid, 200.

Dyeing and Bleaching

THE report of the sub-committee which has been inquiring into combines in the dyeing, finishing, bleaching and printing trades, states that although a questionnaire was sent out on March 31, 1920, to many of the well-known combines and associations, such as the Bradford Dyers' Association, the British Cotton and Wool Dyers' Association, the United Turkey Red Co., Ltd., and the Bleachers' Associations, the sub-committee had been unable to obtain the information on which alone they could arrive at informed conclusions as to the extent to which the processes of dyeing, finishing, bleaching, and printing were affected by any trade combination or as to the effect of any trade combinations, if found, upon supplies, prices, costs and profit at all stages of such processes.

Figures recently furnished by certain firms shortly considered by the sub-committee a few days before their powers expired, showed only the percentage by which the prices, costs, and profits (on turnover, not on capital) of 1919 differed from those of 1913.

"We note," state the sub-committee, "that over the four sections of the industry taken as a whole prices or charges were advanced 207 per cent.; and that profits in 1919 represented a somewhat less percentage of the total turnover of that year than the profits of 1913 did of the turnover of 1913. If it could be assumed that the poundage or yardage output of 1919 was the same as that of 1913 it could be deduced that the actual profit made was nearly three times as great in 1919 than in 1913 and that after deducting Excess Profits Duty the profits retained were roughly two and a half times as great—but no information is given as to the comparative turnovers in the two years in question, and, therefore, no definite deduction of the kind can be made on the strength of the information given in the returns. We note also that the 'combines' advanced their prices or charges more than the 'non-combines,' that, none the less, their ratio of profit to turnover declined somewhat while that of the 'non-combines' increased, and that they paid out a less proportion of their profits in Excess Profits Duty than did the 'non-combines'; also that the costs per unit for fourteen firms increased in the period by 204 per cent., the increase in coal and dyewares being greater than the increase in wages, repairs, and overhead charges; but we can form no opinion from information of this kind as to 'the effect of any trade combination, if found, upon supplies, prices, costs and profits, at all stages of such processes.'"

Imperial College of Science

Opening of a Novel Laboratory

ON Friday, June 24, the Marquess of Crewe presiding, the Lord President of the Council (Mr. A. J. Balfour, M.P.), opened the new semi-large scale laboratory at the Imperial College of Science and Technology, South Kensington. The laboratory, which will be named after its generous donor, Mr. G. W. Whiffen, an old student of the Imperial College, is the result of a bold effort to meet the frequent complaint of manufacturers that students have been found to be insufficiently acquainted with commercial processes at the conclusion of their university training.

Lord Crewe, who is Chairman of the Governing Body of the College, referred in eulogistic terms to the munificence of the donor, Mr. G. W. Whiffen, an old student of the Imperial College. The new laboratory showed a spirit of progress which was very gratifying. In the classics, or modern studies, people could reach high eminence at comparatively small cost, but the student of science required equipment involving great cost and elaboration. The output of this laboratory might prove, to a certain limited extent, a source of gain to the College, but he was certain that in these days of extreme stringency, when national economy was on the lips of everybody and in the hearts of some, the need of such an institution as the Whiffen Laboratory would receive the sympathetic regard of the Lord President of the Council.

Mr. Balfour said the path of science in this country would be smoother if more of our wealthy citizens followed the admirable example of Mr. Whiffen. This laboratory was not merely new to this country, but it had no parallel in any other part of the world. It was not, however, a hazardous experiment; it was admirable from the double point of view of education and of the application of scientific discovery to practical use.

Everybody could well understand that the transition from the laboratory to the works of a great industry was one full of difficulty for students and the primary object of this laboratory was the bridging of the gap. He could not doubt that the experience that would be obtained by students in the Whiffen Laboratory would prove of infinite value to them and to those for whom they would work in economic production. He regarded the advance as one of the greatest possible utility from the educational point of view. It would help the discoverer by enabling theoretical work to find practical application within the very walls of the College, and would add to the efficient application of theory to practice on which so much of the industrial welfare of the country and the progress of the arts must depend. Having watched its progress with the deepest interest he congratulated the College on the liberality of Mr. Whiffen, which was not merely generous, but was also enlightened. This opening ceremony, he said, might well be of epoch-making importance in the annals of the College and possibly in the progress of industrial science in this country.

Sir Arthur Acland, Chairman of the Executive Committee of the Governing Body, who proposed a vote of thanks to Mr. Balfour, referred to the present financial position and expressed the hope that it would not be necessary for them to reduce the salaries of their staffs. Whatever the financial position was now, he believed that this country was not going down and that trade and industry were going to revive; and when this revival took place, as he felt sure it would, the Imperial College of Science and Technology would be wanted more than ever. He wished to say, on behalf of Professor Thorpe, who would be in charge of the Whiffen Laboratory, and Professor Baker, that that day would be a red-letter day in the history of the chemistry department of the Imperial College.

Mr. Balfour then set the machinery in motion by pressing the lever of an electric motor.

AN EXPLOSION in the pellet house of the powder factory of Curtiss and Harvey, Ltd., near Neath, on June 17, resulted in the death of two workmen, John and David Jones. There were about 300 lb. of black powder stored in the building at the time of the explosion. The men who were buried beneath the debris, were extricated by the manager of the works, but died shortly afterwards.

Society of Chemical Industry

Programme of the Annual Meeting in Canada

THE preliminary arrangements for the extensive programme of the annual meeting in Canada of the Society of Chemical Industry have now been completed, and it is unlikely that more than minor changes will be made.

English members will sail from Liverpool on the s.s. *Melita* on August 13, arriving in Montreal on or about August 22. Receptions will be held in Montreal on August 26 and 27, and golf and motor trips, commencing on Sunday, August 28, have also been arranged.

The itinerary is as follows:—

Monday, August 29.—Council meeting at McGill University, 10 a.m. Annual meeting. (*a*) Address of welcome. (*b*) Reply. (*c*) General business of the Society, 11 a.m. Civic reception and lunch, 1 p.m. Visit to McDonald Agricultural College, supper and garden party, 3 p.m.

Tuesday, August 30.—(*a*) Address by a prominent Canadian chemist; (*b*) Pulp and paper symposium (three papers), 11.30 a.m. Luncheon at Windsor Hotel, given by Montreal Section, 1 p.m. Visits to industrial plants, 3 p.m. Banquet at Windsor Hotel (time not stated).

Wednesday, August 31.—Addresses and technical papers, 10 a.m. Luncheon at Windsor Hotel, 1 p.m. Special convocation at McGill University, 3 p.m. Trip down Lachine Rapids, 4 p.m. Leave by night train for Shawinigan, 11.55 p.m.

At Shawinigan, the paper and electrochemical industries will be inspected. The special train will arrive in Ottawa on the morning of September 2, and the day will be occupied in visiting prominent public buildings and industries. The party will arrive in Toronto on Saturday morning, September 3, and will be taken to University Residences and Hart House. It is expected that the morning will be spent in the city and visiting Harbor Works. This will be followed by a luncheon at the Canadian National Exhibition, where the speaker of the day will be one of the prominent visitors. The exhibition authorities have arranged to call this "Chemical Industries Day." The afternoon will be spent at the exhibition, visiting the chemical section and places of industrial interest. This will be followed by a special convocation at the university and a dinner given by the Toronto section of the Society.

On Sunday, September 4, the party will proceed by boat to the Niagara Falls, spending the day on the Canadian side. On Monday morning, power plants and hydro-electric power developments will be inspected, followed by a luncheon, attended by representatives of the American section of the Society, who will take over the party for a visit to plants on the American side; they will leave the same evening by special train for Syracuse. On Tuesday, September 6, the Solvay plant will be visited, the party leaving for Albany that night. After visiting plants of interest in the vicinity, including Schenectady, the party will proceed to New York by means of the Hudson River boats.

From September 7 to September 10 the party will co-operate in joint meetings of the American Chemical Society, and will visit points of interest in the vicinity of New York and Long Island. The Chemical Exposition opens in New York on September 12, and during that week further joint gatherings of societies will be held, the party leaving New York for their return trip towards the end of the week.

Oil from Lemon Seeds

DURING the war, when the want of fats was felt, states the Milan correspondent of *The Times*, Professor Bartolo, of the University of Catania, made a particular study of lemon seeds, which were generally thrown away by the manufacturers of citrate of calcium, citric acid, &c. He experimented with the oil obtained from these seeds in order to determine its nature, its grade of saponification and its utility as a fat, and the results, it is stated, were sufficiently satisfactory to demonstrate the possibility of establishing a new industry.

The extraction of the oil has been effected both by pressure and by means of solvents, the percentage obtained by the latter method being 30-35 per cent., according to the state of ripeness of the seeds. The oil attained by pressure is, it is stated, of a light yellow colour, and of a very pleasant scent.

Work Without Labour

By Ernest J. P. Benn

WHILE we are busy making jobs, sharing out work, inventing new excuses for employment, and trying to make positions for two where there was only one, America is making the most astonishing progress in the science of "work without labour." Everybody over there is keen on production, and willing to put forward any amount of effort to get it; but that effort is generally made by the brain, and not by the muscle. The labouring man is fast disappearing, and the worker would be more correctly described as a director of machinery.

I visited the most up-to-date of the Steel Trust's works at Gary, and hoped that I might see the American breed of the mighty smith, bare to the waist, struggling with the white-hot metal and moulding it at his will. I was taken into a sort of miniature Crystal Palace, 750 ft. long, and about 200 ft. wide, the floor of which was one solid mass of moving rollers. I walked along a gallery or bridge, the whole length of this building. The doors at the end opened, and a huge crane appeared carrying a 2-ton lump of white-hot steel which almost seemed as if it had been trained to know its business. First it was gripped by a pair of massive rollers, which flattened it in one direction, then passed over more of the moving floor to the next pair, which flattened it the other way. On it sped through a long succession of rollers and moulds until on reaching the end of the building it had assumed the shape of five long bars. The automatic rollers pitched these to the other side of the building, where they proceeded to chase one another through a further series of processes until they arrived back at the doors out of which the steel had come, and placed themselves, as if they were used to it, in a railway truck as finished steel rails. Nobody lifted anything, nobody sweated, nobody suffered fatigue; a score of men, dotted about the mills, pressed buttons and moved levers, and each took a dollar and a-half for doing it. An even more wonderful sight is to see the making of railway wheels, with no more hard labour than it takes to drive an automobile. Great machines like motor-cars, running on rails with huge arms which gripped the metal, lifted it from one furnace to another, deposited it under each of a series of stamps, and handed over to the machine shop for finishing. All run by a man who sits in the seat of a huge motor with rather more pride, and about the same mount of work, as the average chauffeur in a Rolls-Royce.

Lest it should be thought that the latest plant of the Steel Combine is something exceptional, other examples can be found at every turn to show the determination of the American workers themselves to reduce labour to a minimum. The chambermaid in the hotel wheels about a wagon which is a mass of appliances for cleaning the room in a hurry; she connects the flex to the electric light, and sweeps and dusts and clears in a fraction of the time that would be necessary by English methods.

Elevators all over America are something which we hardly know here. They work at a rate which no self-respecting lift-man would tolerate. But the American lift-man does very little work; he almost invariably sits on a stool and pushes buttons. He presses with the right foot and the gate opens, with the left foot and it closes, and performs two or three journeys up and down the 25 floors in less time than it generally takes the tube lift to move one way once.

Even the work of wheeling a barrow or a trolly is considered beneath the dignity of a self-respecting American labourer, and the American factories are almost all equipped with electric motor-trolleys run about in a manner with which we are familiar at a few of our leading railway stations. When we introduced women into engineering during the war, we did a great deal to improve our methods in these respects, but it cannot be claimed that we have done away with lifting and carrying, while in America it would be almost true to make that claim. If the worker wants a motor to carry him home, as most of them do, it is not likely that he is going to degrade himself in working hours by carrying bulky weights about.

Travelling carriers, both overhead and underfoot, and moving bands are to be found not only in every factory, but in many of the offices. Overhead or underfoot, or both, something is moving all the time. The cheapness of electric current has a good deal to do with this development. I saw several tea-shops, or lunch-shops, as they are called, with continuous lifts carrying dirty cups and plates to the washing machines in the basement. The waitresses' trays are all of one size, and they push in to moving slits and automatically disappear below. I found a publisher's office with a continuously moving canvas band which carried the books to the packing counter and back again to the postal box. In our dear old country, some union or other would no doubt object that the band was doing their work, but in America, where industry has a sounder economic foundation, nobody is willing to do any work that can be abolished.

America is very busy road-making. The arrears of the war period are heavy, and the demand for new roads insistent. Concrete is the fashionable material, but the American workman will not bemean himself to mix concrete. I suppose I must have seen a hundred concrete-making machines in my short stay in various cities. I was particularly struck with a small type of concrete mixer, not much bigger than a large truck, used for mixing concrete for side walks.

Wherever one looks one finds evidence of this same determination to save labour and get rid of work. The police force might perhaps be regarded as fair game for job making; nobody can object to a few extra policemen, and apart from occasional excitement, the policeman's is a pleasant-enough life for a man who is not worried with an over desire to be energetic. The traffic in most American cities is sufficiently dense to warrant the employment, as with us, of two men at the cross-roads, to hold up the stream in each direction, but American policemen are not willing to be wasted in that way, so one constable stands in the middle of the crossing operating a simple signalling device which tells the driver whether they are to "stop" or "go."

Take the railways. The railwaymen are organised into a brotherhood, and if English ideas had any influence with them, have the power so to arrange matters as to necessitate the employment of ever-increasing quantities of men. Yet one sees no porters on American railway stations. I waited for a quarter of an hour at a junction on the line from New York to Philadelphia, watched five trains come in and go out, and never saw a porter at all; the baggage-check system makes luggage porters unnecessary, and the efficient American woman does not want a couple of porters to help her in and out of the train.

These are simple illustrations given with a view to emphasising the totally different attitude of mind in England and America on this question of work and production. Sir Robert Horne told the House of Commons the other day that "a job must be found for everybody." He could not have said anything so impossible in America, they don't understand the word "job" in the sense which it has assumed in recent years with us, and a position in which somebody will pay somebody else some wages, irrespective of what is done, or where the wages come from, is outside the comprehension of the average American. We have been so nurtured in the school of "9d. for 4d.," so steeped in the notion that wealth and work were fixed quantities which must be shared out, that it is difficult to grasp the American point of view, but if we are ever again in a position to buy American goods, if the handicap of the Exchange and the anti-dumping restrictions are cleared out of the way, we shall assuredly feel its effects in a manner that will not be agreeable to us.

Starch from Burrawang Palm

THE extraction of starch from the Burrawang palm is now being undertaken on an experimental scale on the Clyde River, New South Wales. The method of extraction consists of stripping the plant of its fibre coat and paring until the core is reached. This is then minced, a spray of water playing on the material during the operation. The pulpy fluid gravitates into a mechanical sieve, and here the fibrous matter is separated from the starchy solution. The solution is then pumped into a series of settling tanks from which impurities are syphoned off. In the final settling tank the condition has become starchy and the colour white. When settled to a thick paste the crude starch is removed to shallow trays and there artificially dried for 16 days in an evaporator. In the final stage of drying the mass breaks up into crystals. It is hoped later to obtain glue as a by-product.

Scarab Oil Burning Company

Expansion of the Business

SPEAKING at the first ordinary general meeting of the Scarab Oil Burning Co., Ltd., on June 22, Lieut.-Col. F. R. Macdonald (chairman) said the period covered by the report was one of difficulties, extremely hard work, and great anxiety, and resulted in the sale, comparatively speaking, of very few burners. Their only object was to get the burners installed in as many different classes of plant as possible.

They had installed their apparatus for use in many different directions, and were still constantly discovering new fields in which it could be usefully and profitably employed. Up to date they had supplied installations for the following purposes: Boilers of railway and road locomotives; all types of stationary boilers, and those of ferry boats and steam launches; hot water supply systems, &c. Furnaces of the following kinds: Lead and gold refining, tin-plate, glass, forge, muffle, reverberatory, annealing, oil refining, hotel cooking ranges, ships' galleys and refuse incinerators.

In this connexion, he said, they had done some very valuable pioneer work, and developed and patented entirely new systems of liquid fuel burning, which would be of inestimable advantage to the community. Referring particularly to their hand-starting, self-operating system, by means of which fuel oil could be used without any auxiliary power, Col. Macdonald said this system would have a great sphere of application both at home and abroad.

It has been their policy to prove fully the value of their patents at home before seeking to make arrangements abroad. They were taking steps to develop their business abroad, with the result that they had already received considerable orders from the Soudan, Spain, Portugal, Argentina, France, Switzerland and Germany.

Reconstitution Processes in Shales

AT a meeting of the Mineralogical Society, held on June 21, Dr. A. E. H. Tutton in the chair, Mr. A. Brammall read a paper on the Trend of Reconstitution Processes in Shales, Slates and Phyllites, in which he correlated microscopical data with data deduced from chemical analysis. The finely powdered rock was extracted with (*a*) 20 per cent. hydrochloric acid, (*b*) 50 per cent. hydrochloric acid, and these extracts were analysed and discussed with reference to the molecular proportions of the bases present. The residual slime was treated with dilute hydrofluoric acid, freed from silica gel, and thoroughly washed. Free carbon particles were floated off by the froth produced on vigorously shaking up the slime in a flask half full of water to which a few drops of amyl alcohol, paraffin and sodium silicate had been added. Samples of coarse-grade and fine-grade sericite were separated by elutriation and analysed. Heavy or insoluble residues were obtained and examined. Data referring to Bolivian rocks (collected by Dr. J. W. Evans) and, for comparative purposes, to the Skiddaw slate, were discussed. The general trend was towards the establishment of a metastable ternary system of white mica, chlorite and quartz, by a process of molecular differentiation: (*a*) Monad-oxides, type R_2O, allied with alumina, silica and water (mica); (*b*) diad-oxides, type RO, allied with alumina, ferric oxide, silica and water (chloritic matter); and (*c*) free silica (quartz).

In the early stages this differentiation was imperfect: the mica contained iron oxides, magnesia, &c., and the chloritic matter absorbed alkalies. The identity of mineral species evolving from the chloritic matter depended partly upon the molecular ratio $R_2O_3 : RO$, and this in turn depended partly upon the reduction of ferric oxide to ferrous oxide. The development of rutile, ilmenite, epidote, &c., was probably subordinate to the main trend.

As a result of recommendations from Mr. S. H. HODGKIN, managing director of the Pulsometer Engineering Co., Ltd., of Oxford Road, Reading, the Reading Chamber of Commerce have appointed a Committee to consider the question of establishing a Central Exchange for Road Transport.

United Kingdom imports of German dyes during May show very appreciable decreases as compared with April. No alizarine or synthetic indigo was imported from this source and the decrease under the heading of dyes and dyestuffs was £14,367. Scientific instruments were £5,105 less.

The Nitrate Outlook

Proposed Standardisation of Prices

AT a meeting held in Rotterdam on June 20, at which the most important nitrogen interests were represented, a long discussion took place on the present outlook, and it was unanimously agreed that the consumption of both nitrate and sulphate of ammonia might be materially increased by a standardisation of prices by the various producers and by a much more extensive system of propaganda.

In a circular dealing with the conference Messrs. Aikman (London), Ltd., state that the basis of an agreement among the various producers was discussed at length, and, with a view to arriving at a scheme suitable for all parties, the German Stickstoff Syndikat offered—in order to help the immediate position and to give sufficient time to work out a permanent scheme—to abstain from offering nitrate or sulphate of ammonia for export, and not to increase their present plants for six months, the condition being that the other nitrogen producers should come to an agreement to maintain prices at a reasonable level, and not to dump quantities into Germany during that period at below the world's market prices. On these conditions they stated they would put no obstacle in the way of Chilian nitrate being imported into Germany.

Discussions are continuing, and it is hoped that some basis for an agreement may eventually be come to.

Cornbrook Chemical Co., Ltd.

Petition for Compulsory Winding Up Dismissed

IN the Companies Winding-up Court, on Tuesday, June 21, Mr. Justice P. O. Lawrence had before him the petition of Mr. Thomas Taylor, of the Buxton Hydro, Buxton, for an order for the compulsory liquidation of the Cornbrook Chemical Co., Ltd., of 3, Fenchurch Street, E.C. When the petition was called on, his lordship was informed that an agreement had been reached between the parties, and he was asked to dismiss the petition.

His lordship assented.

Molasses as a Liquid Fuel

MOLASSES promises soon to take its place as a liquid fuel to replace solid fuels—coal and wood. Every year in Cuba and other sugar-producing districts millions of gallons of "black strap" molasses are run into the ditches and into the sea. It has been shown possible by Dr. Hildebrandt, in America, to burn molasses and to recover potash from the ash. The calorific value of "black strap" is 13,000 B.Th.U. per lb., whilst that of the best American coal is little more—say 13,500. Successful demonstrations of the method of molasses burning (under boilers) have been made, and a company with a capital of two million dollars has been founded, under the name of "The Black Strap Fuel & Potash Products Co." It is said that a million and a half dollars have been paid for the patents.

In addition to making the sugar refineries independent of external supplies of fuel, the new fuel will provide an additional source of potash. 135 to 150 lbs. of potash are produced per ton of molasses burnt, and the ash may be used directly as a fertiliser, or worked up into potash salts in purer form. The invention appears to provide a more suitable and profitable outlet for the waste molasses than the schemes for alcohol production by fermentation.

Affairs of the Central Chemical Company

THE examination in bankruptcy of Fowler Ferguson Webster, sole partner of the Central Chemical Company, Victoria Works, Baird's Brae, Rockvilla, was held at the County Buildings, Glasgow, on Monday. The debtor stated that he started business in July, 1920, with borrowed capital of £150, which had been repaid. He took over premises in which he afterwards discovered there was no water supply. On this account he was unable to manufacture his own goods, with the result that he had to buy goods at three times the price at which he could have manufactured them. The coal strike also had an adverse effect on his business. A statement of affairs was submitted showing liabilities amounting to £252 18s. 9d. and assets amounting to £177 4s. 9d.

The examination was closed.

Chemical Matters in Parliament

German Reparation (Recovery) Act

In reply to Captain W. Benn (House of Commons, June 22), Mr. Harmsworth said that legislation similar to the German Reparation (Recovery) Act was in operation in France, Roumania, and Serbia. Belgium, Greece, Liberia, Portugal, Siam, Italy, and Japan had initiated similar legislation.

Mr. Myers (House of Commons, June 25), asked the Financial Secretary to the Treasury whether, in connexion with the holding up of imports in Manchester under the German Reparation (Recovery) Act, he could state how many of the necessary documents filled up and sent in by the importers in April had not yet been dealt with nor the goods released; whether he was aware that the delay experienced was resulting in a corresponding delay in payment to the manufacturers for the goods, thus prejudicing the position of the importers; and whether special arrangements would be made to have all goods released as soon as the necessary steps had been taken?

Mr. Young said about 16,000 claims for exemption from the provisions of the German Reparation (Recovery) Act had been received by the Commissioners of Customs and Excise, of which about 10,000 were received in the month of April, but he was unable to say how many of these were from Manchester. The examination of this mass of claims must necessarily occupy a considerable time, especially as in a large number of cases the evidence submitted in the first instance was incomplete. But in order so far as possible to obviate inconvenience and delay to importers, the Commissioners had from the outset allowed immediate delivery of goods claimed to be exempt on bond being given to pay the levy if the claim was not substantiated. Every effort was being made to deal with the claims on hand as rapidly as possible.

Mr. Chamberlain, replying to Mr. Bottomley (House of Commons, June 27), said no estimate had been formed of the quantity of potash and zinc which Germany could supply to this country in reduction of her financial obligations under the Treaty of Versailles.

Replying to a question by Mr. A. M. Samuel, Sir P. Lloyd-Greame said he was informed that an official announcement had been issued by the German Ministry of Finance that German exporters, on producing a British certificate of the amount levied and necessary details would be reimbursed in respect of any levy collected since May 12 last in German currency at the rate of exchange prevailing on the day when the certificate was issued.

Mr. Myers then asked the President of the Board of Trade if he could state the weight of German dyes which had been contributed by Germany in connexion with reparation; the cost of these dyes to the Government at the time of placing them on the market; and the prices being charged to the trade?

Sir P. Lloyd-Greame said the total weight of synthetic dyestuffs received up to the present for the British Empire under the Reparation Clauses of the Treaty of Versailles was approximately 4,053 tons, and the total value credited to Germany was about 110 million paper marks, to which must be added cost of carriage, storage and distribution. The prices charged to the trade—which, of course, varied according to the classes and brands of dyestuffs—were as nearly as possible the market prices ruling at the time of sale, and had been fixed in consultation with representatives of the consumers.

Nauru Phosphates

Mr. Ormsby-Gore (House of Commons, June 22), asked the Secretary of State for the Colonies (1) who were the phosphates commissioners who disposed of the phosphate deposits on Nauru and Ocean Islands; what they were paid and who by; whether these phosphates commissioners had entered into a contract with Mr. G. V. Parker, giving the latter a monopoly in the distribution of all phosphates obtained from these islands on account of the British Government; what were the terms and duration of this contract; and were there any restrictions as to selling price or profits per ton; (2) what was the estimated amount in tons of raw Nauru phosphate which would be available for distribution in this country, Australia, and New Zealand, respectively, under the terms of the Nauru Island Agreement Act during this and next year; whether, under the contract with Mr. G. V. Parker, the whole of the amount received by this country must be sold in this country, or might any of it be sold to Canada or other British Dominions or Colonies; and, if so, as raw phosphate or as mixture?

Sir A. Boscawen, replying, said the Commissioners, under the Nauru Island Agreement, were Mr. A. R. Dickinson, appointed by His Majesty's Government; Mr. H. B. Pope, appointed by the Government of the Commonwealth of Australia; and Mr. A. F. Ellis, appointed by the Government of New Zealand. The first two received salaries of £2,000 a year, and the New Zealand Commissioner received £1,000 a year. In accordance with Article 2 of the Agreement, these salaries were payable from the proceeds of the sales of phosphates. With regard to the other points raised, as was explained on Monday last (*see* THE CHEMICAL AGE, June 25, page 732), the Phosphate Commissioners and not the Ministry were the responsible body for making sales of Nauru phosphate. The Ministry had no information as to the tonnage available, or as to the methods by which the phosphate would be marketed in England by Mr. G. V. Parker, but he would make inquiries of the Commissioners and would communicate the result.

Mr. Ormsby-Gore then asked whether the statement made by the Ministry last autumn that he expected to put Nauru phosphate on the market at 2s. per unit had been realised, and what was the relative cost per phosphatic unit in the United Kingdom of raw Nauru phosphate, Florida phosphate, Peruvian phosphatic guano, superphosphate, and Bilston basic slag, respectively?

Sir A. Boscawen said no statement as to the price at which Nauru phosphate would be placed on the market had been issued by the Ministry at any time. As raw Nauru phosphate and Florida phosphate were not offered as such to the farmer, and as, according to the Ministry's information, Peruvian phosphatic guano was unobtainable here, it was impossible to give the relative cost per phosphatic unit of these materials in the United Kingdom. It was understood, however, that a mixture of ground Nauru phosphate and basic-slag was being placed on the market by the Slag Phosphate Company at approximately 3s. per phosphatic unit.

Power Alcohol

Sir S. Hoare (House of Commons, June 28), asked the Secretary of State for the Colonies whether he was aware of the potentialities of the West Indies as a centre for a successful alcohol industry for power purposes; and, if so, whether he would make representations to the Chancellor of the Exchequer with a view to a remission of the full spirit duty and surtax upon the importation of West Indian manufactured spirit into the United Kingdom?

Mr. Wood said the subject was under the consideration of the Department of Scientific and Industrial Research. When that consideration was completed he would inquire further as to the grounds for making representations to the Chancellor of the Exchequer in the sense suggested.

United States Import Restrictions

In reply to Captain W. Benn (House of Commons, June 23) Mr. Baldwin said the importation of oxalic and formic acid into the United States of America was prohibited, except under licence, as a war measure in February, 1918, and, so far as he was aware, this prohibition had not since been withdrawn. It had recently been continued in force for three months by the Emergency Tariff Act. Prices at the date when the prohibition was first imposed were on a much higher level than at the present time.

Gas Mantle Company's Shares

In reply to Mr. Myers (House of Commons, June 25), who asked the President of the Board of Trade whether his attention had been drawn to the advance in the value of the shares in the Welsbach Gas Mantle Company following upon the Second Reading of the Safeguarding of Industries Bill; and whether this fact would be taken into consideration in connexion with the Government's policy on this Bill, Mr. Baldwin said he was aware that the price of these shares rose for a few days in the middle of this month, but he understood that it had since fallen to substantially the same level at which it stood last April.

British Cellulose Company

In reply to questions by Mr. Briant and Lieut.-Commander Kenworthy (House of Commons, June 27), Mr. Young said

the two directors of the British Cellulose & Chemical Manufacturing Co., Ltd., appointed by the Government at a salary of £500 a year, were Brig.-General Sir William Alexander, K.B.E., and Sir Philip Henriques, K.B.E. They were not drawing directors' fees and these fees were put into the Exchequer.

Oil Fuel

Replying to Mr. Percy (House of Commons, June 27), Mr. Chamberlain said 116 locomotives on United Kingdom railways had been fitted with oil burning apparatus, and a further seven were in course of adaptation.

British Dyes

Mr. Myers (House of Commons, June 27), asked the President of the Board of Trade whether, in the establishment of British Dyes, the goodwill of certain private businesses was purchased and, if so, whether there was any provision in the conditions of sale to prevent the firm or firms concerned establishing a new business in competition with British Dyes.

Sir P. Lloyd-Greame said he was not clear if the inquiry related to British Dyes, Ltd., which on its formation in 1918 acquired the undertaking of Read, Holliday & Sons, Ltd., or to the British Dyestuffs Corporation, which was formed to acquire the control of British Dyes, Ltd., and Levinstein, Ltd. In the former case no such condition as had been suggested was imposed; in the latter case the nature of the amalgamation was such that the question would not arise.

Explosives Industry

Mr. Lawson (House of Commons, June 27), asked the Prime Minister whether his attention had been called to the report on the Explosives Industry of the Sub-Committee appointed under the Profiteering Acts to the effect that the Nobel combine practically controlled the policy of the various trade associations in the industry, and was thus able substantially to determine the prices at which explosives and detonators were sold in this country, and that the present agreement of the Treasury and the Board of Trade with the combine did not appear to afford a workable scheme of control or supervision; and whether he would put into force the recommendation of the Committee that the powers of the Board of Trade should be supplemented by statutory authority to require from the combine any information which might be necessary to enable a review to be made of its operations and prices, and to enable the Board to make recommendations for the adequate protection of the consumer?

Replying Sir W. Mitchell-Thomson said he was aware of the recommendations of the Committee. The question of vesting in the Board of Trade the additional powers suggested by the Committee would be considered in connexion with the general legislation on trusts which the Government hoped to introduce in due course.

Safeguarding of Industries

In Committee on the Safeguarding of Industries Bill (House of Commons, June 29), Mr. Kiley moved to postpone the operation of the duties to January 1, 1922, in order to enable importers to clear themselves of existing Commitments. Mr. Baldwin objected that this extension was too long.

The amendment was negatived by 189 to 77.

Mr. Cautley moved an amendment to exempt from duty goods imported in fulfilment of a contract made prior to May 31 this year.

The amendment was negatived without a division.

Major Mackenzie Wood moved an amendment to provide that the combined key industry and anti-dumping duties on the same article should not exceed 33⅓ per cent.

The amendment was defeated by 216 to 84.

Mr. Lawson moved to omit the sub-section of the anti-dumping clause, which makes the depreciation of the currency in the country where imported goods are manufactured a reason for the imposition of the anti-dumping duty.

The debate on this amendment was cut short by the guillotine. The amendment on a division was rejected by 189 to 90, and the motion to report progress was carried by 202 to 73.

The Treasury give notice, under Section 54 of the Finance Act, 1916, that as from June 27 until further notice the rate of interest to be allowed on sums deposited with the Inland Revenue for satisfying any EXCESS PROFITS DUTY will be 5 per cent. per annum.

Indian Paper Materials

Proposed New Industry

INQUIRIES into the possibility of making use of Indian paper materials in this country have been carried out by the Committee for India of the Imperial Institute, and the reports have just appeared in a volume published by Mr. John Murray under the title, "Reports on Timbers and Paper Materials" (Price 4s.). In the section on paper materials a general statement is given as to the world's pulp and paper-making industry, special reference being made to the position in India. The opinion is expressed that Indian bamboos and savannah grasses are valuable resources for paper-making, which occur in circumstances not unfavourable for their commercial development. The immediate aim in the development of an Indian paper-pulp industry, which should receive every encouragement from the Government of India, should be to reduce, and finally to replace (as far as possible) by Indian supplies, the large amount of pulp and paper imported into that country. It is believed that the replacement of imports by Indian produce would be quickly followed by a surplus production, which would be available for export.

Affairs of Parry Pure Drug Company

A MEETING of the creditors of the Parry Pure Drug Co., Ltd., 1, Broad Street Place, E.C., was held recently at the offices of Mr. W. H. Stentiford, 1, Broad Street Place, London, E.C. It was reported that the shareholders, at an extraordinary general meeting, had passed a resolution that, with a view to reconstruction, the company be wound up voluntarily. At the same meeting Mr. Stentiford was appointed to act as liquidator. According to the statement of affairs the liabilities amounted to about £3,500. Mr. Stentiford stated he understood that the liabilities would only amount to approximately £2,000, but since his appointment additional claims had been received, with the result that the total unsecured indebtedness would be nearer £4,000 than £2,000. The assets were estimated to produce £2,300, and were made up as follows: Plant and machinery at cost £3,500, estimated to produce £1,750; stock in trade expected to realise £450; and book debts valued at £100. On March 23 last a debenture for £500 was issued as security for cash advanced to the company by a director. After discussing the position a resolution was passed in favour of Mr. Oliver Sunderland, accountant, of 15, Eastcheap, London, E.C., being appointed as the liquidator of the company together with a committee consisting of Mr. J. Feldman, and the representative of Barclays Bank, Ltd., Warbay & Sons, and Cillaphone & Co.

Death of Mr. D. Brown

A CORRESPONDENT referring to the death of Mr. David Brown, F.R.C.E., F.C.S., senior partner of the firm of Messrs. J. F. Macfarlan & Co., manufacturing chemists, Edinburgh, announced briefly in THE CHEMICAL AGE last week, states that Mr. Brown was a native of Edinburgh and a son of Mr. D. R. Brown, of the same firm. He was educated at the Edinburgh Royal High School and studied chemistry at Edinburgh University. He assisted the late Professor George Wilson of that University and subsequently acted in a similar capacity to Professor Anderson in Glasgow. Later he gained a knowledge of applied pharmacy as a member of the staff of the Apothecaries Hall, London, and continuously engaged in the manufacture of chemical substances used in medicine in association with his father and ultimately as senior partner of the firm. He was the author of several valuable papers on chemical subjects, and in order more fully to qualify in research work he spent some time in the laboratory of St. Bartholomew's Hospital, London, and assisted in certain investigations made by Dr. A. Matthiessen. His contributions to the Pharmaceutcal Society's Transactions included notes on chloroform. Though he refrained from publishing anything on the opium alkaloids, he recognised oxynarcotine as an undescribed substance and handed it over to Dr. Wright, who made an analysis and gave the results to the Chemical Society. The preparation of salicin from willow bark was begun in Mr. Brown's time and he made visits to the willow growing districts of England and Belgium to acquire a fuller knowledge of the subject. He retired from the active service of his firm some years ago.

From Week to Week

Dr. W. WILSON has been appointed to the London University chair of Physics tenable at Bedford College.

The Chemical Society of Western Australia has decided to inaugurate a study circle on the subject of colloids.

Mr. C. A. L. Loney, managing director of the Ammonia Company of Australia, is at present visiting Europe.

Amongst a great number of oil fuel fitments recently installed is one for the National Tar Products, Ltd., Barrhead, Glasgow.

The Minister of Agriculture at Prague has purchased 3,000 carloads of phosphate from the United States for autumn requirements.

The National Oil Refinery Works at Skewen have been made entirely INDEPENDENT OF COAL, even the small locomotives being run on oil-generated steam.

THE SARCO ENGINEERING CO., LTD., chemical and general engineers, of 108, Fenchurch Street, E.C., have removed to Kerr House, 36-38, Kingsway, W.C.1.

ROSE, DOWNS & THOMPSON, LTD., announce the removal of their London offices from 12, Mark Lane, E.C.3, to 28, Victoria Street, Westminster, S.W.1.

Mr. James I. Millar, one of the directors of Perry & Hope, Ltd., Glasgow and London, resigned his seat on the board and severed his connection with the company on June 30.

In 1920 Japan imported 1,900,000 tons of fertilisers, valued at 239,870,000 yen, a decrease in quantity of about 20,000 tons, but an increase in value of 45,500,000 yen as compared with the previous year.

Twenty one cases of SCIENTIFIC BOOKS despatched by the British Committee for Aiding Men of Science and Letters in Russia, of which Professor C. S. Sherrington is a member, have reached their destination safely.

Dr. F. H. Campbell, hon. secretary of the Victorian branch of the Australian Chemical Institute, has been appointed to the Risdon Grimwade lectureship in chemistry, recently founded at Trinity College, Melbourne University.

The tank steamer "British Ensign," which is one of a number now running regularly in this trade, arrived at Swansea recently from Abadan, Persian Gulf, with 2,552,583 galls. of CRUDE MINERAL PETROLEUM.

Extensive damage was caused by a fire at the Leven Creosote Works of Alexander Bruce & Co., Ltd., Glasgow, on June 22. The building and the recently-installed machinery were completely destroyed, the damage being estimated at about £10,000.

Supplies of FOREIGN FUEL OIL being available, Scottish Oils, Ltd., are reported to have cancelled orders for closing down the works and mines at Pumpherston and Oakbank. All the steam power at the various oil works is produced by a newly-installed oil fuel plant.

The Council of the University College of Wales, Aberystwyth, on June 24 appointed Dr. T. CAMPBELL JAMES as Professor of Chemistry, in succession to Professor B. Mouat Jones, who was appointed director of the Manchester Municipal College of Technology in March last.

MADAME CURIE left New York for Cherbourg by the s.s. *Olympic* on June 25. She is bringing with her the gramme of radium presented to her by President Harding, on behalf of the women of America. The radium is being carried in a special casket lined with lead, weighing 130 lb.

In view of the proximity of the Hull municipal almshouses to the chemical works of Major & Co., Ltd., and the possible danger to the inmates from fumes, &c., the trustees last week decided to seek the help of the Corporation. In the absence of funds to rebuild the almshouses elsewhere they suggested that Messrs. Major should buy them out.

A general discussion on "Catalysis with Special Reference to Newer Theories of Chemical Action" will take place on Sept. 28 next, before the FARADAY SOCIETY. During the afternoon session a discussion will be opened by Professor J. Perrin on "Radiation Theory," and in the evening Dr. Irving Langmuir will open a discussion on "Heterogeneous Reactions."

On Monday a FATAL ACCIDENT occurred in the works of Messrs. A. Walker & Co., chemical manufacturers, of Irvine, the victim being Peter Murdoch, an engineer in the employ of the firm. The man, it appears, had been working on some machinery when he w s caught between a pinion wheel and a buffer, and sustained injuries to which he succumbed almost immediately.

Past and present members of the general board and Executive Committee of the National Physical Laboratory, Teddington, on Tuesday presented to the laboratory a bas-relief of the late director, Sir Richard Glazebrook. The presentation was made in the Administration Building by Sir Joseph J. Thomson, and was received on behalf of the laboratory by Professor C. S. Sherrington. The bas-relief is the work of Mr. J. Cluyscnaar, of Brussels.

We regret to announce the death of Mr. Alexander MCNAB, of Middleton Kerse, N.B., which, following on an operation, took place at a nursing home in London on June 24. Mr. McNab was well known in the City, his directorial activities including, in addition to others, the Arizona Copper Co., Ltd., the Distillers' Co., Ltd., and the Esperanza Copper & Sulphur Co., Ltd. He was also interested in a new Indian oil company, the board of which he had consented to join.

In spite of the attention which has been given during the past 10 years to the recovery of coal by-products in South Africa, it is estimated that a million tons a year are now wasted. Much experimental work has been done recently on the testing of coal for the production of coke and tar and the distillation of oils and creosote, as there are large accumulations of waste and low-grade coal at the various collieries which can be treated for by-products, although they are not suitable for sale.

On June 21, before the Mineralogical Society, Dr. H. HILTON submitted a note on "Crystal Measurement." It was pointed out that considerable labour could be saved by measuring the angles between zones through two faces instead of the angles between zones through one face and the angles between this face and the rest. A point of geometrical interest in connexion therewith was also discussed.

Professor G. T. MORGAN, professor of chemistry at the University of Birmingham, has been appointed for the coming session as external examiner in chemistry for the diploma examinations of the Bradford Technical College; and Professor A. G. GREEN, of the British Dyestuffs Corporation, is examiner in dyeing industries. The facilities for research which have been greatly extended at the college during the past year include a new physical-chemistry laboratory.

At a special meeting of the Council of the University College of South Wales and Monmouthshire, held at Cardiff on June 22, Mr. W. J. JONES, D.Sc., F.I.C., was appointed Professor of Chemistry. Professor Jones is a native of Llanrwst, North Wales, and was educated at the University College of North Wales, graduating in 1908 with first-class honours in chemistry. In 1910 he was elected to a Fellowship in the University of Wales, and in 1913 was appointed assistant lecturer and demonstrator in the University of Manchester. During the war he joined the 2nd Royal Welch Fusiliers and fought in France, where he was wounded in 1916. Afterwards he worked in the Department of Explosive Supplies. In July, 1919, he was appointed senior lecturer in chemistry at Manchester University. Professor Jones was granted the D.Sc. degree in 1918 for original investigations in chemistry, and in all has published about thirty works on chemistry.

On Tuesday evening, Sir George Beilby delivered the "James Forrest" lecture at the Institution of Civil Engineers on "FUEL PROBLEMS OF THE FUTURE," in which he examined the position of fuel alcohol and the various substances, vegetables, &c. The use of cellulosic material he dismissed as not yet possible, and said of alcohol that until it could be made from waste materials which could be collected and heated at small cost it did not seem likely that Empire-produced alcohol could be imported into this country on a considerable scale. The development of oil shales as a source of liquid fuel was still only in its initial stages, but it had evidently a great future before it. The problems of the utilisation of peat, which covered a wide range, both technically and economically, were mainly of local importance, and were not likely to affect the fuel supplies of the world to any great extent. The production of alcohol on a really large scale as a motor fuel of high availability bristled with economic and technical difficulties, and it was still too soon to pronounce an opinion on the possibilities of the future.

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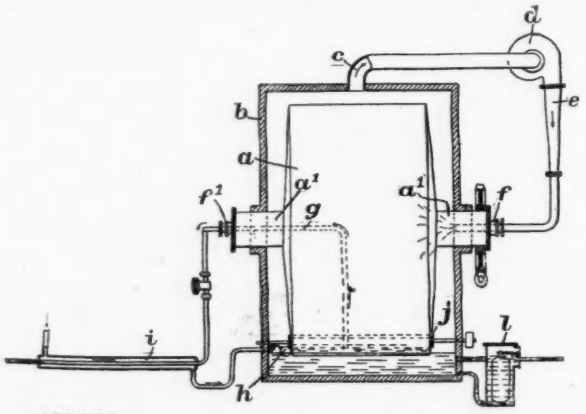
Abstracts of Complete Specifications

163,793. EVAPORATION OR DISTILLING APPARATUS. N. Testrup, 47, Victoria Street, London, S.W.1, and Techno-Chemical Laboratories, Ltd., "Fairlawn," Clarence Road, Clapham Park, London, S.W.4. Application date, February 24, 1920.

This apparatus for evaporating or distilling is of the type in which the heating medium comprises the vapour evolved from the liquid under treatment, after its temperature has been raised by compression. A revolving drum *a* is mounted on a hollow spindle *a'* and enclosed in a casing *b*, having an outlet *c* for the vapour. The liquid is supplied through the heat interchanger *i* and float-controlled valve *h*, so that the drum *a* dips into it as it rotates, and thus carries over a thin film of the liquid. The vapour is drawn off through the compressor *d*, in which its temperature is raised from 3°C. to 5°C. by compression, and then delivered through a pipe *e* and stuffing box *f* to the interior of the drum to heat the walls and evaporate the film of liquid. Any condensed water is drawn off by the syphon *g*, which passes through another stuffing box f^1, and thence to the heat interchanger *i* to heat



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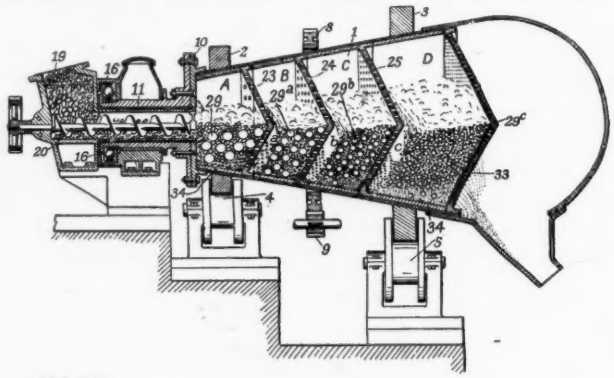
the incoming liquid. As the liquid becomes concentrated it is removed through a vessel *l* provided with a valve controlled by the specific gravity of the liquid. Any solid matter deposited on the drum from the liquid is removed by a brush *j* near the bottom, which may be arranged to act in a part of the reservoir which is partitioned off. Alternatively, a rubber strip or metal scraper may be used. In modified form of apparatus the drum *a* does not dip into the liquid, but the latter is spread over it in a thin film by a contacting roller which dips into the liquid. The drum may be of a hard and polished material, or may have a rough outer surface, or may be covered by metal gauze or absorbent material. In some cases the vapour given off may contain substances which may deposit on the inner surface of the drum *a* and diminish its efficiency; such deposits may be removed by scrapers suspended from the trunnions a^1. Other apparatus of this character has been described in Patents Nos. 149,055, 150,068 and 150,807, *see* THE CHEMICAL AGE, Vol. III., pages 292, 380 and 428.

163,856. PULVERISING MACHINES. A. M. Read, First Avenue and Big Four Railroad, Columbus, Ohio, U.S.A. Application date, March 19, 1920.

The apparatus is of the type in which a rotating conical barrel is divided into compartments provided with grinding balls of graduated sizes. The barrel 1 is provided with bearing rings 2 and 3, resting on rollers 4 and 5, and is driven by toothed gearing 8, 9. The closing plate 10 is provided with a tubular extension 11 supporting a ball bearing 16 containing a feeding trough 18. The material is fed from a hopper 19 to a rotating helical conveyor 20 which delivers it to the first compartment *A*. The compartments *A*, *B*, *C*, *D* are separated by partitions 23, 24, 25 having perforations of decreasing diameter. Heavy refractory grinding balls—29, 29*a*, 29*b*, 29*c*—are provided in the compartments, and are also of progressively decreasing size. The dimensions of the apparatus are so arranged that the bottom part 34 of the barrel is inclined so that the material is advanced at a pre-determined speed, and the perforated partitions are such that their lower parts, 33, are inclined to the vertical and to the sloping part 34. As the material becomes more finely ground its bulk increases, so that the compartments *A*, *B*, *C*, *D* are made of progressively increasing size. When the barrel is rotating, the finer particles descend to the bottom of each compartment, and are sifted



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into the succeeding compartments, so that they form a continuous stream along the bottom from end to end of the barrel. The conical shape of the partitions produces a more effective pulverising action of the balls 29 on the material, and spaces *a*, *b*, *c* are formed at the side of each partition, which facilitate the passage of the ground material through the perforations. Modified forms of apparatus are described, in which the barrel is cylindrical, with its axis inclined downwards, and the partitions of spherical curvature, and in another modification the barrel is conical with an inclined axis and the partitions are plane.

163,874. MERCURY COMPOUNDS OF GLUCOSIDES, MANUFACTURE OF. O. Imray, London. (From Society of Chemical Industry in Basle, Basle, Switzerland.) Application date, April 6, 1920.

Glocosides such as amygdalin, salicin, arbutin and phenol glucosides are heated with mercury salts to produce organic mercury compounds which are readily soluble in water to neutral or acid solutions. Several examples of the process of preparation are given.

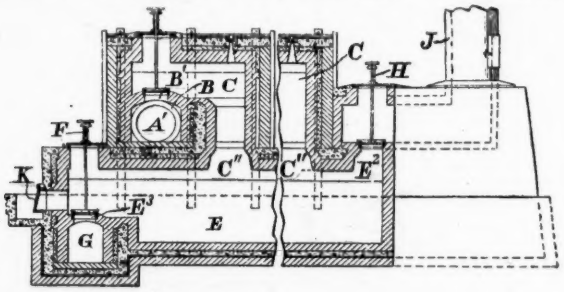
163,877. ALKALI SILICATES, MANUFACTURE OF READILY SOLUBLE. F. J. Phillips, 10, Old Burlington Street, London, W.1. Application date, April 9, 1920.

Specification 151,339 (*see* THE CHEMICAL AGE, Vol. III., page 485) describes a process in which the materials for forming the silicate are mixed together and fused, and the vitreous mass then broken up and ground with water. Silicic acid is then precipitated by adding an acid other than carbonic or chromic, and is re-dissolved in the silicate by further grinding, giving a silicate containing a higher proportion of silica and a smaller proportion of alkali. In the present process, the silicic acid is prepared by adding sulphuric acid to cold water-glass and removing the resulting precipitate by dialysis. The precipitate is then added to a solution of silicate and combined with it as before.

163,900. GAS PRODUCER CONDUITS. R. C. Metcalfe, 239, North Fifth Street, Newark, N.J., U.S.A. Application date, May 6, 1920.

The object is to provide an arrangement of ducts and chambers to transmit the hot gases from a battery of gas producers to a furnace or the like, and to remove the tar and other impurities without interfering with the passage of gas. Each producer is provided with a single outlet main *A* which discharges into

a passage B, all such passages being horizontal and parallel to one another. Each passage B has two ports B' opening into separate chambers C, which are side by side, only one being shown. These chambers open through passages C'' into two passages E, which are side by side beneath the passages B, but at right angles to them. The chambers E open through ports E^2 at one end into a stack J, and are controlled by a valve H. Each chamber E is provided with an air inlet opening controlled by a valve K, and with an outlet E^3, controlled by a valve F leading to a gas delivery



163,900

channel G. The gas is thus provided with two alternative passages E, only one of which is normally in use, so that the other may be opened for cleaning. The chambers E are substantially larger in cross-section than the passages B and C, so that the velocity of the gas is reduced, and particles of tar and carbon or other solid are deposited in them. These deposits may be burned out by opening the valves H and K, so that a current of air passes through the chamber to the stack J. In practice, the gas may be diverted from one chamber to the other at intervals of two or three days.

163,937. CRUDE LACTOSE OR MILK SUGAR, METHOD FOR THE PURIFICATION OF. J. Tavroges, J. W. Roche and G. Martin, The Co-operative Wholesale Society, Ltd., 109, Corporation Street, Manchester. Application date, July 22, 1920.

Lactose solution after removal of the albumen is usually purified by boiling with animal charcoal, filtering and evaporating until the crystallising point is reached. The crystals are separated and the treatment repeated. It is now found that the purification may be effected in one stage by dissolving the lactose in water and adding 5 to 10 per cent. of sulphite, a hydrosulphite, or a mixture of these, such as sulphur dioxide, sodium sulphite, sodium bisulphite or sodium hydrosulphite. The mixture is heated to 80°C., filtered, and evaporated.

163,964. PURIFIERS, CONDENSERS AND THE LIKE, MEANS FOR REVERSING THE FLOW OF GAS IN. Firth, Blakeley, Sons & Co., Ltd., 15, Park Row, Leeds, and W. Blakeley, Beechwood, Church Fentor, near Leeds. Application date, November 15, 1919.

The apparatus is similar to that described in Specification No. 163,095 (*see* THE CHEMICAL AGE, Vol. III., p. 702), in which gas may be caused to flow through a pair of purifiers either in an upward or a downward direction. Each purifier is provided with two ports which communicate respectively with the top and bottom of the purifier. Each pair of ports is connected externally by a four-way valve having one of its openings below the valve. These valves are themselves connected by a third four-way valve to the main inlet and outlet pipes.

NOTE.—The following specifications, which are now accepted, were abstracted in THE CHEMICAL AGE when they became open to inspection under the International Convention: 140,089 (Soc. l'Air Liquide Soc. Anon. pour l'Etude et l'Exploitation des Procedes G. Claude), relating to apparatus for carrying out exothermic chemical reactions under high temperature and pressures, *see* Vol. II., p. 562; 142,493 (G. Grondal), relating to apparatus for lixiviating granular or pulverulent material, *see* Vol. III., p. 78; 144,659 (Badische Anilin & Soda Fabrik), relating to transforming ammonia into a fertiliser salt, *see* Vol. III., p. 214; 144,681 (E. I. Du Pont de Nemours & Co.), relating to tetra substituted ureas, *see* Vol. III., p. 214; 147,231 (C. Otto & Co., Ges.), relating to coke ovens, *see* Vol. III., p. 305; 147,534 (M. Melamid), relating to artificial tanning substances, *see* Vol. III., p. 429; 148,784 (A. Riedel), relating to recovery of nitrogen in fuel, *see* Vol. III., p. 518.

International Specifications not yet Accepted

162,655. BORON. G. Constant, and V. Raisin, 66, Rue de Rome, Paris. International Convention date, April 30, 1920. Addition to 162,252. (*See* THE CHEMICAL AGE, Vol. IV., p. 736.)

A mixture of boric anhydride or an alkali or other fusible borate or mixture of borates and a saline or basic electrolyte such as sodium chloride or an alkali borate is fused, and then electrolised to obtain boron.

162,657. CASEIN COMPOSITIONS. E. Krause, 4, Kantstrasse, Steglitz, Berlin, and H. Blücher, 49, Wasserturmstrasse, Stö, Leipzig, Germany. International Convention date, May 3, 1920.

Casein is ground and moistened with a solution of formaldehyde, or, alternatively, the unground casein is soaked in the solution. The mixture is dried until free from aldehyde, heated above 90°C., and moulded under a pressure above 100 atmospheres.

LATEST NOTIFICATIONS.

165,049. Means for maintaining a definite pressure in connexion with liquids, vapours, or gases. Schwarz, J. June 15, 1920.
165,050. Economic process for impregnating animal and vegetable fibres of all kinds. Boucherie, M. June 15, 1920.
165,051. Fusing and casting silica, alumina, and other refractory minerals, and the obtainment of castings to be employed therein. Roiboul, M. De. June 15, 1920.
165,062. Forced lubrication apparatus provided with pumps. Bolinders Mekaniska Verkstads Aktiebolag, J. & C. G. June 17, 1920.
165,066. Distillation of water. Kestner, P. June 15, 1920.
165,068. Heating and decanting apparatus for use in purifying the feed-water of steam-generators. Kestner, P. June 12, 1920.
165,076. Manufacture of the products of oxidation of aromatic hydrocarbons. Barrett & Co. June 18, 1920.
165,082. Process for obtaining metallic electrolytic deposits easily detachable from the cathode. Soc. D'Electro-Chimiet D'Electro-Metallurgie. June 18, 1920.
165,083. Manufacture of copper compounds of substantive azo-dyestuffs. Farbenfabriken vorm. F. Bayer & Co. June 14, 1920.
165,084. Process for the manufacture of a preparation of hexamethylenetetramine. Chemische Fabrik vorm. Sandez. June 12, 1920.
165,085. Process for the production of acetaldehyde from acetylene. Soc. Anon. De Produits Chimiques Establissements Maletra. June 15, 1920.
164,749. Hardening of metal and hardened metal articles. Aktiebolaget Svenska Kullagerfabriken. June 15, 1920.
164,757. Process for the preparation of tropinone-mono-carboxylic acid ester. Merck, E. Firm of., Wolfes, O., and Maeder, H. June 16, 1920.
165,094. Apparatus for evaporating liquids to dryness. Thurholm, K. L. E. June 21, 1920.

Specifications Accepted, with Date of Application

136,574. Acetic anhydride, Manufacture of. H. Dreyfus. June 30, 1914.
137,529. Amino compounds from trinitrotoluol, Process for the production of. E. Bielouss. January 6, 1919.
149,316. Titanic oxide pigments, Production of. Titan Co. Aktieselskabet. August 1, 1919.
154,870. Ore concentration. Minerals Separation, Ltd. November 29, 1919.
158,533. Borneol, Manufacture of. Fabriques de Produits Chimiques de Thann et de Mulhouse. February 4, 1920. Addition to 144,604.
164,374-5-7. Cellulose derivatives, Manufacture of. H. Dreyfus. September 1, September 3 and September 4, 1919.
164,384-5-6. Cellulose derivatives, Manufacture of products having a basis of. H. Dreyfus. December 3, 1919.
164,407. Distillation apparatus. G. W. Ellis. January 8, 1920.
164,418. Centrifugal separators. O. Imray. (W. Mauss.) February 4, 1920.
164,488. Azo dyes, Production of. J. L. Kane. March 8, 1920.
164,500. Centrifugal dryers. H. P. Hoyle. March 10, 1920.
164,525. Evaporation of liquids and recovery of the vapours by condensation, Method and arrangement for. F. Merz. March 16, 1920.

164,529. Petroleum oils, Distilling. F. A. Kormann. March 17, 1920.
164,547. Treatment of pulverulent or granular materials with gases and particularly the roasting of ores and the like. R. Martin and J. I. Richards. March 23, 1920.
164,572. Sulphuric acid chambers, Construction of. R. E. Dior. April 14, 1920.
164,581. Thorium, Recovery of. H. Wade. (Lindsay Light Co.) April 21, 1920.
164,594. Indigoid vat dyestuffs, Manufacture of. W. Carpmael. (Farbenfabriken vorm. F. Bayer & Co.) May 5, 1920.
164,625. Waste or spent lime sludge, Process for the utilisation of. H. Levinson and G. Martin. June 18, 1920.
164,627. Sulphuric acid, Manufacture of. Unione Italiana fra Consumatori e Fabricani di Concimi e Prodotti Chemici and A. Sonneck. July 5, 1920.

Applications for Patents

Barton, G. V. Apparatus for manufacture of lead oxide. 17,058. June 22.
Bauer, E. Retorts for distillation. 17,230. June 23. (Germany, July 3, 1920.)
Blicquy, J. de and Callebaut, C. E. P. M. Dye vats or machines. 17,080. June 22.
Bradley, A. Fluid soaps. 16,823. June 20.
Davies, J. H. Manufacture of soap. 17,288. June 24.
Goslings, N. Process for purification of oils and fats. 17,116, 17,117. June 22. (Holland, August 3, 1920.)
Goslings, N. Process for purification of oils and fats. 17,239. June 23. (Holland, December 14, 1920.)
Gray, G. Artificial manure distributor. 17,394. June 25.
Kacser, S. Retorts for distillation. 17,230. June 23. (Germany, July 3, 1920.)
Khorassany, M. T. Process for manufacture of soap. 17,137. June 22.
Leadbeater, J. W. Obtaining carbon from peat for decolorizing. 17,169. June 23.
Lott, C. R. Manufacture of glass articles. 17,237. June 23.
Meguin Akt.-Ges. Butzbach. Carbonizing bituminous shale, &c., at low temperature. 17,352. June 24. (Germany, September 4, 1920.)
Morison, D. B. De-aeration or de-oxidizing of water. 17,149. June 22.
Müller, W. Carbonizing bituminous shale &c. at low temperature. 17,352. June 24. (Germany, September 4, 1920.)
Perrem, F. C. Means for preventing oxidation and volatilization of contacting parts in induction coils of internal-combustion engines. 16,955. June 21.
Pawson, H. Treatment of rock phosphates, &c. 17,079. June 22.
Pummerer, R. Process for production of artificial resins. 17,151. June 22. (Germany, June 25, 1920.)
Steinhilber, H. Process for producing cellulose from reeds, &c. 16,975. June 21. (Germany, May 13.)
Techno-Chemical Laboratories, Ltd. Utilization of water power. 16,874. June 20.
Zdanowich, J. O. Manufacture of acetylated cellulose and artificial silk, films, &c., therefrom. 16,850. June 20.

Contravention of Merchandise Marks Act

London Manufacturers Fined

At Kingston, on Tuesday, the Surrey County Council summoned R. White & Sons, Ltd., of Neate Street, Camberwell, for applying a false trade description within the meaning of the Merchandise Marks Act, 1887, to lemonade and still lemonade, by describing it as being "made from Messina lemons."

Giving evidence Mr. E. Hinks, the county analyst, said the lemonade sold was an effervescent dilute solution of sugar, flavoured and acidified with phosphoric acid, of which there was present four times the maximum amount allowed by the British Pharmacopœia. There was no trace of lemon juice in it.

Mr. Walter Frampton, who defended, said that commercially it was impossible to make a lemonade that would keep from the pure juice of the lemon, and the method of manufacture adopted in this case had been unchallenged for 40 years. The description was not fraudulent, because for flavouring purposes oil of lemon was used which was made from the peel of Messina lemons. He called Dr. Teed, analyst to the City of London, and other authorities, who said it was justifiable to describe the drink as "made from Messina lemons."

The Magistrates held that the public were liable to be deceived by the notice "made from Messina lemons," and they imposed penalties amounting to £41 5s., including costs.

Oxalic and Formic Acids

To the Editor of THE CHEMICAL AGE

SIR,—The reply given by the President of the Board of Trade in the House of Commons on June 23 to a question by Captain Wedgwood Benn regarding the importation of oxalic and formic acids into the United States of America is, according to our judgment and experience, distinctly misleading.

It may be perfectly true that the import of these two articles was prohibited except under license as from February, 1918, but for some considerable time at any rate there has been no difficulty whatever in importing these articles into the U.S.A. Either licenses have been very freely granted or these articles have come in under general licenses.

We are advised, further, that it is a fact that since the passing of the Emergency Tariff Act licenses for both articles have become unobtainable. It is no doubt true that the price of the two acids on the day of prohibition, namely, February, 1918, was higher than is the price to-day, but that applies to nearly everything, whether protected by tariff or otherwise. The matter of immediate concern is that whilst prices fell consistently until the passing of the Emergency Tariff Act, the immediate effect of this Act was to advance the U.S.A. domestic price appreciably. The inference from this fact as to what is likely to happen under the Safeguarding of Industries Bill is too obvious to need pointing out.—Yours, etc.,

A LONDON FIRM OF CHEMICAL MERCHANTS.

June 29, 1921.

Cornbrook Chemical Co., Ltd.

To the Editor of THE CHEMICAL AGE

SIR,—In order to explain to our customers and to answer the many enquiries we have had, we write to inform you that the petition recently presented by Mr. Thomas Taylor (a shareholder of the Company) to have the Company wound up for purely personal reasons has, by consent of Mr. Taylor to-day been dismissed, he paying the Company's agreed costs. Mr. Taylor has ceased to be a director and has entirely severed his connexion with this Company.—Yours, etc.,

3, Fenchurch Street, E.C. H. G. FERGUSON,
June 22, 1921. (Director and Secretary).

Recent Wills

Mr. F. W. STEDMAN, of High Street, Ashford, chemist and druggist £3,916
Mr. DANIEL DE PASS, of Old Mansions, Kensington, and of Fenchurch Buildings, London, E.C., guano merchant £768,976
Mr. J. J. Whalley, of Lawn Bank, Duke's Brow, Blackburn, Lancs, china clay merchant..... £18,939
Mr. R. Porter, of Riversdale, Elland, Yorks, gas engineer £22,445
The Right Hon. John Fletcher, first Baron Moulton, of 57, Onslow Square, South Kensington, and Forest Green, Lyndhurst, Hants £162,506 16s.
Mr. J. S. MacArthur, of Pollockshields, Glasgow, paint manufacturer and oil merchant £104,962
Mr. J. D. Best, of Manor Close, Chislehurst, formerly of Newcastle-on-Tyne, oil refiner..... ... £35,572
Mr. W. H. Kearsley, of Fountain Terrace, Ripon, Yorks., a director of Messrs. Robert Kearsley & Co., varnish manufacturers..... £11,080

Patents Court Cases

NOTICE is given that requests have been made under Section 24 of the Patents and Designs Acts, 1907 and 1919, for the following patents to be indorsed "Licences of Right":—101,973 and 126,039 (Process for the preparation of benzene mono-sulphonic acid); 130,650 (Process for the preparation of acetic aldehyde from acetylene); 130,651 (process for the preparation of acetic acid by oxidation of acetaldehyde); 132,755 (process for the preparation of trichlorethylene from symmetrical tetrachlorethane); 132,757 (process for the preparation of symmetrical tetrachlorethane); 139,443 (process for the purification of solutions of zinc sulphate). All these are in the name of Soc. Anon. Compagnie des Products Chimiques d'Alais et de la Camargue. Any notice of objection must be given by July, 29, 1921.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to* THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.

Market Report

THURSDAY, June 30.

The news of the settlement of the coal strike has brought about a greater feeling of optimism than there has been for some time, but as we go to press, there has not been time for the brighter tone to translate itself into business. We hope, however, that we shall be able to report a better state of things in an early issue.

There is still a certain export inquiry, but the volume of business actually placed is not important.

General Chemicals

ACETONE.—Stocks are strongly held and the price remains firm.

ACID ACETIC has been in much better demand at recent rates.

ACID CITRIC remains unchanged.

ACID FORMIC remains unchanged.

ACID LACTIC is in very slow demand, and the tendency favours buyers.

ACID TARTARIC.—The market is still in buyers' favour, and little business is apparent.

BARIUM CHLORIDE.—The market remains lifeless. The price is nominally unchanged.

BLEACHING POWDER.—The tendency is easy in the absence of business,.

COPPER SULPHATE remains unchanged.

FORMALDEHYDE.—Small business is reported, and the tendency seems to be rather firmer.

LEAD ACETATE has again been in some inquiry, but buyers are reluctant to commit themselves.

LEAD NITRATE remains uninteresting.

POTASH BICHROMATE.—No business is reported.

POTASH CARBONATE is still a declining market, and stocks are practically unrealisable.

CAUSTIC POTASH.—Small sales are reported from time to time, but the position remains distinctly unsound.

POTASH PERMANGANATE is only in small demand and inclined to be weaker.

SODA ACETATE.—No change.

SODA BICHROMATE.—No change.

SODA CAUSTIC is only a nominal market, although several export inquiries have been received.

SODA PHOSPHATE is uninteresting.

SODA PRUSSIATE.—There is no further fall in price, but the export demand has dried up for the time being.

SODA SULPHIDE is still offered at very low prices by Continental sellers, but little business is being done.

Coal Tar Intermediates

In view of the settlement of the coal strike, a noticeably better inquiry has been received this last week for these materials. The amount of business actually placed has not been very great, but at the same time certain orders have been booked and more may be expected in the near future, as the works get going on their new supplies of coal.

ALPHA NAPHTHYLAMINE is very quiet, but the price remains the same.

ANILINE OIL continues in medium request at recent quotations, but buyers are not inclined to commit themselves largely at the moment.

ANILINE SALT.—Some inquiry has been received both for home trade and for export.

BENZIDINE BASE is quietly steady.

BETA NAPHTHOL.—Some orders have been booked at recent quotations, but the price may be shaded a little for fair quantities.

DIPHENYLAMINE continues in request with the price unchanged.

"H" ACID.—Some inquiry has been received, but next to no business is being done.

NITRO BENZOL.—A fair inquiry is reported and some business is being done at latest values.

Coal Tar Products

The market generally for coal tar products is inactive, and supplies of most products are difficult to obtain for prompt delivery.

90's BENZOL is practically unobtainable, and is nominally quoted at 2s. 10d. to 3s. per gallon on rail.

PURE BENZOL is quoted at 3s. to 3s. 2d.

CREOSOTE OIL is scarce for prompt delivery and worth 8½d. to 9d. per gallon in the North, and 9d. to 9½d. in the South.

CRESYLIC ACID is slightly more active and is worth 2s. 4d. on rails for the pale 27/99 per cent. quality, while the dark is worth 2s. to 2s. 2d.

SOLVENT NAPHTHA is quoted at 2s. 5d. to 2s. 6d.

HEAVY NAPHTHA is worth 2s. 4d.

NAPHTHALENE is inactive and is worth from £8 to £11 per ton for crude qualities, while the refined is worth from £18 to £23 per ton.

PITCH.—The market is unchanged. The approximate values at present are 75s. to 77s. 6d., f.o.b., East coast, 80s. to 85s., f.o.b., London.

Sulphate of Ammonia

There are no new features to report, but it is anticipated that the home trade price will be further reduced at the end of this month.

Current Prices

Chemicals

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	2	3	to	0	2	6
Acetone oil	ton	95	0	0	to	100	0	0
Acetone, pure	ton	105	0	0	to	110	0	0
Acid, Acetic, glacial, 99-100%	ton	65	0	0	to	67	10	0
Acetic, 80% pure	ton	53	0	0	to	54	0	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst	ton	69	0	0	to	70	0	0
Carbolic, cryst. 39-40%	lb.	0	0	6½	to	0	0	7
Citric	lb.	0	2	7	to	0	2	9
Formic, 80%	ton	72	10	0	to	75	0	0
Gallic, pure	lb.	0	4	0	to	0	4	3
Hydrofluoric	lb.	0	0	8½	to	0	0	9
Lactic, 50 vol.	ton	35	0	0	to	37	10	0
Lactic, 60 vol.	ton	40	0	0	to	42	10	0
Nitric, 80 Tw.	ton	41	0	0	to	44	0	0
Oxalic	lb.	0	0	9½	to	0	0	10
Phosphoric, 1.5	ton	55	0	0	to	57	0	0
Pyrogallic, cryst	lb.	0	7	9	to	0	8	0
Salicylic, Technical	lb.	0	1	0	to	0	1	2
Salicylic, B.P.	lb.	0	1	5	to	0	1	6
Sulphuric, 92-93%	ton	8	10	0	to	8	15	0
Tannic, commercial	lb.	0	3	6	to	0	3	9
Tartaric	lb.	0	1	8	to	0	1	9
Alum, lump	ton	18	0	0	to	18	10	0
Alum, chrome	ton	37	10	0	to	40	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	12	0	0	to	13	0	0
Aluminium, sulphate, 17-18%	ton	15	0	0	to	16	0	0
Ammonia, anhydrous.	lb.	0	2	2	to	0	2	4
Ammonia, .880	ton	43	0	0	to	45	0	0
Ammonia, .920	ton	30	0	0	to	32	10	0
Ammonia, carbonate	lb.	0	0	4	to		—	
Ammonia, chloride	ton	65	0	0	to	70	0	0
Ammonia, muriate (galvanisers)	ton	50	0	0	to	52	0	0
Ammonia, nitrate	ton	55	0	0	to	60	0	0
Ammonia, phosphate	ton	95	0	0	to	100	0	0
Ammonia, sulphocyanide	lb.	0	3	0	to	0	3	0

	per	£	s.	d.		£	s.	d.
Amyl acetate	ton	420	0	0	to	425	0	3
Arsenic, white, powdered	ton	52	0	0	to	55	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0
Barium, chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	19	0	0	to	20	0	0
Nitrate	ton	50	0	0	to	52	0	0
Barium Sulphate, blanc fixe, dry	ton	30	0	0	to	31	0	0
Sulphate, blanc fixe, pulp	ton	16	10	0	to	17	0	0
Sulphocyanide, 95%	lb.	0	1	6	to	0	1	0
Bleaching powder, 35-37%	ton	18	0	0	to	19	0	0
Borax crystals	ton	34	0	0	to	36	0	0
Calcium acetate, Brown	ton	12	0	0	to	13	0	0
,, Grey	ton	19	0	0	to	21	0	0
Calcium Carbide	ton	29	0	0	to	30	0	0
Chloride	ton	12	10	0	to	13	0	0
Carbon bisulphide	ton	65	0	0	to	67	0	0
Casein, technical	ton	90	0	0	to	92	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	11	6	to	0	12	6
Oxide, black	lb.	0	16	0	to		—	
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	35	0	0	to	37	0	0
Cream Tartar, 98-100%	ton	130	0	0	to	135	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol	ton	95	0	0	to	97	10	0
Formusol (Rongalite)	lb.	0	4	9	to	0	5	1
Glauber salts, commercial	ton	6	0	0	to	7	0	0
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	45	0	0	to	50	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	50	0	0	to	52	0	0
Carbonate (White Lead)	ton	43	0	0	to	46	0	0
Nitrate	ton	55	0	0	to	57	0	0
Litharge	ton	38	10	0	to	40	0	0
Lithopone, 30%	ton	30	0	0	to	32	10	0
Magnesium chloride	ton	18	0	0	to	19	0	0
Carbonate, light	cwt.	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	10	10	0	to	11	10	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	70	0	0	to	75	0	0
Sulphate	ton	75	0	0	to	78	0	0
Methyl acetone	ton	95	0	0	to	100	0	0
Alcohol, 1% acetone	ton	145	0	0	to	150	0	0
Nickel sulphate, single salt	ton	60	0	0	to	62	0	0
Nickel ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potash, Caustic	ton	36	0	0	to	38	0	0
Potassium bichromate	lb.	0	0	9½	to		—	
Carbonate, 90%	ton	40	0	0	to	42	10	0
Chloride	ton	38	0	0	to	40	0	0
Chlorate	lb.	0	0	8½	to	0	0	9
Meta bisulphite, 50-52%	ton	130	0	0	to	140	0	0
Nitrate, refined	ton	50	0	0	to	52	0	0
Permanganate	lb.	0	1	9	to	0	1	10
Prussiate, red	lb.	0	2	6	to	0	2	9
Prussiate, yellow	lb.	0	1	3	to	0	1	4
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	3	15	0	to		—	
Seconds	cwt.	3	10	0	to		—	
Sodium acetate	ton	30	0	0	to	32	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	7	to	0	0	7½
Bisulphite, 60-62%	ton	35	0	0	to	37	10	0
Chlorate	lb.	0	0	5½	to	0	0	5½
Caustic, 70%	ton	24	0	0	to	24	10	0
Caustic, 76%	ton	25	0	0	to	25	10	0
Hydrosulphite, powder, 85%	lb.	0	2	3	to	0	2	6
Hyposulphite, commercial	ton	15	0	0	to	16	0	0
Nitrite, 96-98%	ton	45	0	0	to	46	0	0
Phosphate, crystal	ton	25	0	0	to	27	0	0
Perborate	lb.	0	1	9	to	0	2	0
Prussiate	lb.	0	0	7½	to	0	0	8
Sodium Sulphide, crystals	ton	19	0	0	to	20	0	0
Sulphide, solid, 60-62%	ton	26	0	0	to	30	0	0
Sulphite, cryst	ton	15	0	0	to	16	0	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Strontium Nitrate	ton	84	0	0	to	90	0	0
Strontium Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	19	0	0	to	19	10	0
Roll	ton	19	0	0	to	19	10	0
Tartar emetic	lb.	0	2	3	to	0	2	6
Tin perchloride, 33%	lb.	0	2	6	to	0	2	7
Tin Perchloride, solid	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals)	lb.	0	1	8	to	0	1	9
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	45	0	0	to	47	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

		£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	4	0	to	0	4	3
Alphanaphthol, refined	lb.	0	4	6	to	0	4	9
Alphanaphthylamine	lb.	0	3	0	to	0	3	3
Aniline oil, drums extra	lb.	0	1	7	to	0	1	8
Aniline salts	lb.	0	1	8	to	0	1	10
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	4	9	to	0	5	0
Benzidine, base	lb.	0	8	6	to	0	9	0
Benzidine, sulphate	lb.	0	9	0	to	0	9	6
Benzoic acid	lb.	0	2	3	to	0	2	6
Benzoate of soda	lb.	0	2	3	to	0	2	6
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	8	0	to	0	8	6
Betanaphthol	lb.	0	2	9	to	0	3	0
Betanaphthylamine, technical	lb.	0	9	6	to	0	10	0
Croceine Acid, 100% basis	lb	0	5	0	to	0	6	3
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	6	9	to	0	7	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	6	to	0	1	9
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	3	0	to	0	3	3
Dimethylaniline	lb.	0	4	0	to	0	4	3
Diphenylamine	lb.	0	4	6	to	0	4	9
H-Acid	lb.	0	10	0	to	0	10	6
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	0
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	4	0	to	0	4	3
Naphthionate of Soda	lb.	0	4	3	to	0	4	6
Naphthylamin-di-sulphonic-acid	lb.	0	5	0	to	0	5	6
Nitronaphthalene	lb.	0	1	5	to	0	1	6
Nitrotoluol	lb.	0	1	4	to	0	1	5
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	2
Orthotoluidine	lb.	0	2	3	to	0	2	6
Orthonitrotoluol	lb.	0	0	10	to	0	1	0
Para-amidophenol, base	lb.	0	12	6	to	0	13	0
Para-amidophenol, hydrochlor	lb	0	13	0	to	0	13	6
Paradichlorbenzol	lb.	0	0	7	to	0	0	8
Paranitraniline	lb.	0	4	3	to	0	4	6
Paranitrophenol	lb.	0	2	9	to	0	3	0
Paranitrotoluol	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled	lb.	0	13	6	to	0	14	6
Paratoluidine	lb.	0	7	6	to	0	8	0
Phthalic anhydride	lb.	0	3	9	to	0	4	0
Resorcin, technical	lb.	0	7	6	to	0	8	0
Resorcin, pure	lb.	0	8	6	to	0	9	0
Salol	lb.	0	2	9	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	4	to	0	1	6
Tolidine, base	lb.	0	8	6	to	0	10	0
Tolidine, mixture	lb.	0	2	9	to	0	3	0

Reduced Price of Benzole Lubricants

THE National Benzole Co., Ltd., of 30, Grosvenor Gardens, London, S.W.1, advise us that the prices of "N.B.6" benzole lubricants (medium and heavy) have recently been reduced, the trade prices being as follow :—40-gallon barrels, 5s. 9d. per gallon; 10-gallon drums, 6s. 6d. per gallon; and 5-gallon drums, 6s. 9d. per gallon.

Catalogues Received

WE have received from Joseph Baker, Sons & Perkins, Ltd., of Kingsway House, Kingsway, London, W.C.2, a copy of a new brochure, "The Best Process for Washing Rubber," dealing with a number of their machines designed for the washing of rubber.

United States exports of cottonseed oil during April amounted to 20,997,,362 lb., valued at $1,591,494, according to the Bureau of Foreign and Domestic Commerce. The countries taking the largest shipments were Denmark, Germany, the Netherlands, Canada, the United Kingdom, Italy and Uruguay.

Company News

BENN BROTHERS, LTD.—A second interim dividend at the rate of 2½ per cent. per annum was paid on July 1.

NEW TAMARUGAL NITRATE.—An interim dividend of 5 per cent. (1s. per share) less tax is payable on July 18.

COMMONWEALTH OIL CORPORATION.—The annual general meeting of the Corporation will be held at River Plate House, E.C., on July 7.

AMERICAN CYANAMID.—The quarterly dividend of 1¼ per cent. on the preferred stock will be paid on July 9 to holders on the books at June 29.

SCARAB OIL BURNING CO., LTD.—The directors have decided to pay a dividend at the rate of 7 per cent. per annum on the preference shares for the period from September 17, 1919, to February 28, 1921.

DISTILLERS' CO.—The directors recommend a final dividend on the ordinary shares of 12s., free of tax, making 10 per cent. for the year. The sum of £100,000 will be placed to reserve and £5,000 to fire insurance, leaving to be carried forward £108,994.

MAJOR & CO.—A dividend of 10 per cent., less tax, is announced on the ordinary shares for the year; £3,500 goes to reserve for depreciation; £7,142 is placed to capital reserve, while £6,479 remains to be carried forward. Last year the dividend was 10 per cent., with bonus (free of tax) of 5 per cent.

TEAM BY-PRODUCT COKE CO., LTD.—Dealings in the following securities have been specially allowed by the committee under Temporary Regulation 4 (3). These securities will rank *pari passu* with those in which special settling days have already been appointed as soon as they are identical and the certificates are ready for distribution, and with those for which an official quotation has already been granted as soon as they are identical and are officially quoted: 51,050 shares of £1 each, fully paid, Nos. 198,951 to 250,000.

LAUTARO NITRATE CO.—An extraordinary general meeting of the Company will be held on July 5, when shareholders will be asked to confirm the resolution, passed at the extraordinary general meeting held on June 20, that the capital of the Company be reduced from £550,000 to £350,000, the reduction to be effected by returning the capital paid up on 40,000 shares of £5 each, being the shares represented by share warrants to bearer and share certificates surrendered under the agreement made between Messrs. Collin et Cie. and the Company.

CORNISH KAOLIN, LTD.—A Stock Exchange announcement states that dealings in 108,220 shares of 10s. each fully paid, Nos. 1 to 108, 220, and 131,780 shares of 10s. each, 4s. paid, Nos. 108, 221 to 240,000, have been allowed by the committee under Temporary Regulation 4 (3). These securities will rank *pari passu* with those in which special settling days have already been appointed as soon as they are identical and the certificates are ready for distribution, and with those for which an official quotation has already been quoted as soon as they are identical and are officially quoted.

ANGLO-AMERICAN OIL CO.—The report for 1920 states that the profit for the year, after providing for excess profits duty, corporation tax, &c., amounted to £2,931,886. Deduct depreciation on steamships, plant, &c., £559,267; income tax, £507,193; interest and exchange, £600,268—making, together, £1,666,728, leaving a net profit of £1,265,158. An interim dividend of 3s. per share was paid on January 15, and the directors now recommend a final dividend of 3s. per share, free of tax, payable July 15, leaving £365,158 to be carried to surplus, making the total £2,128,884.

NOBEL INDUSTRIES, LTD.—A Stock Exchange announcement authorises dealings under Temporary Regulation 4 (3) in 838 ord. shares of £1 each, fully paid, Nos. 7,472,587 to 7,472,610, 7,581,956 to 7,582,694, and 7,951,025 to 7,951,101; and 1,284 six per cent. cumulative preference shares of £1 each, fully paid, Nos. 5,986,643 to 5,986,774, 6,084,294 to 6,085,255, and 6,232,066 to 6,232,255. These securities will rank *pari passu* with those in which special settling days have already been appointed, as soon as they are identical and the certificates are ready for distribution, and with those for which an official quotation has already been granted as soon as they are identical, and are officially quoted.

CALTEX OIL CO.—The report to October 31, 1920, states that, as the company did not begin to market its oil until October, 1920, the balance-sheet could only include one month's sales, and in order to give the shareholders later information, the balance-sheet is supplemented by a profit and loss account for the further six months ended April 21, 1921. This shows that the company has made a net profit of $95,557. An increase of earnings is anticipated for the second half of the current year, based on present earnings from the Camalote well and from the resale of oil from the McFarland well. The directors feel that it is in the best interests of shareholders to pursue a conservative policy at this stage, and accordingly they do not propose to declare an interim dividend.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. NO.
Melbourne ...	Pharmaceutical preparations. Replies should be addressed to the Official Secretary, Commonwealth of Australia, Commercial Information Bureau, Australia House, Strand, London, W.C.2.	—
Toronto ...	Druggists' sundries	743
New Brunswick	Clay property. Replies to the High Commissioner for Canada, 19, Victoria Street, London, S.W.1.	—
South Africa...	Glassware; chemists' sundries ...	744
Liege ...	Chemists' supplies...	746
Sofia ...	Machine oil; impure petrol. Replies to the Department of Overseas Trade, 35, Old Queen Street, Westminster, S.W.1.	—
Guatemala ...	Jute bags	758
Sydney, N.S.W.	Glassware, &c.: Replies to the Official Secretary, Commonwealth of Australia, Commercial Bureau, Australia House, Strand, London, W.C. 1.	—
Toronto ...	General chemicals, especially zinc oxide; manganese; potassium; lead salts; soda salts; red lead; lithopone; coal tar products and intermediates; barytes; sulphur; whiting; French chalk.	759

Tariff Changes

SIERRA LEONE.—An amended Customs tariff increases the import duty on salt from 10s. to £1 10s. per ton.

FRANCE.—A summary of a new French law modifying the taxation on acetic acid and vinegar whether imported or manufactured in France appears in the Board of Trade *Journal* (June 23, p. 714). In addition to the Customs duty the new duties notified are to be imposed on imported dilute acetic acid, and acetic anhydride.

Chemical Exporter's Failure

A SITTING for the public examination of Ernest George Hill, chemical importer and exporter, Fenchurch House, 5, Fenchurch Street, E.C., was held and concluded at the London Bankruptcy Court on June 24, before Mr. Registrar Francke. A statement of his affairs showed liabilities £1,264 and no assets. The debtor stated that in 1918 he entered into partnership with his brother with whom he traded as general merchants and importers and exporters of chemicals. His brother retired in January, 1919, and he (debtor) continued the business alone until the following August, when he transferred it to Hill Brothers (London), Ltd. He acted as managing director of the company until December, 1920, when it went into compulsory liquidation. His present position was due to heavy interest charges, and loss on income through the failure of the company.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Partnerships Dissolved

DAVIES, R. G., PENNY, N. M., and BATCHELOR, J. D., carrying on business as glass, lead, oil and colour merchants at 35, Broad Street, Worcester, under the style of Davies, Batchelor & Co., has been dissolved as from May 14, 1921. All debts will be received and paid by R. G. Davies and J. D. Batchelor, who will carry on the business in partnership under the style of Davies, Batchelor & Co.

TIMMIS, J., and KIRK, E. S., carrying on business as chemists and druggists, 91, High Street, Beckenham, Kent, under the style of Timmis & Kirk, by mutual consent as and from May 31, 1921. All debts will be received and paid by E. S. Kirk, who will in future carry on the business.

Bankruptcy Information

JOHNSON, B. C., late 477, Stanton Road, Stapenhill, Burton-on-Trent, but whose present address is unknown, trading in co-partnership with B. J. Townsend as the Trent Soap & Chemical Co., at Bank Square, Burton-on-Trent, Stafford, chemical manufacturer. Court: Burton-on-Trent. Date of Receiving Order: June 20, 1921. No. of Receiving Order: 7. Creditors petition.

First Meetings and Public Examinations

MAY, P. W., residing at 65, Rachel Street, Liverpool, and carrying on business alone as P. W. May & Son, 173, Smithdown Lane, Liverpool, salt merchant and drysalter. Court: Liverpool. First meeting: July 1, 1921, 3 p.m., at the offices of the Official Receiver, 11, Dale Street, Liverpool. Public examination: July 18, 1921, 11 a.m., at the Court House, Government Buildings, Victoria Street, Liverpool.

THE TRIPLEX SAFETY GLASS CO., LTD., 1, Albemarle Street, London. High Court of Justice. Creditors' meeting: July 7, 1921, 11.30 a.m., at Bankruptcy Buildings, Carey Street, Lincoln's Inn, London, W.C.2. Contributories' meeting: July 7, 1921, 12 noon, at the above address.

Order Made on Application for Discharge

BONAVENTURA, F. A., trading in co-partnership with Aveline, H. E., and Harrison, E., as Felice Bonaventura & Co., at 24, Great Tower Street, London, E.C., and residing at 97A, Armitage Mansions, Golders Green Road, Golders Green, Middlesex, chemical merchant and importer. High Court of Justice. Date of Order: May 25, 1921. Nature of Order made: Bankrupt's discharge suspended for two and a half years from January 19, 1921, and that he be discharged as from July 19, 1923. Public examination concluded January 19, 1921.

Companies Winding Up Voluntarily

ANGLO-SPANISH CO., LTD. (in voluntary liquidation).—general meeting of members will be held at 1, Guildhall Chambers, 31-34, Basinghall Street, London, E.C.2, on Tuesday, July 26, 1921, at 1.30 p.m. H. Gimson, Liquidator.

GLASS MANUFACTURERS' SUPPLY & FURNACE CONSTRUCTION CO., LTD. (in voluntary liquidation).—A meeting of creditors will be held at the offices of the Liquidator, 6, Market Street, York, on Saturday, July 2, 1921, at 10 a.m. A. E. Johnson, Liquidator.

QUAIN OZONE SYNDICATE, LTD. (in voluntary liquidation).—A meeting of creditors will be held at 17, Victoria Street, London, S.W., on Thursday, June 30, 1921, at 3.30 p.m. V. A. Halford, Liquidator.

Liquidator's Notice

HOLLINWOOD CHEMICAL CO., LTD.—A meeting of creditors will be held at 400, Manchester Road, Hollinwood, near Oldham, on Tuesday, July 5, 1921, at 11.30 a.m. *Note.*—This notice is formal. All creditors have been or will be paid in full.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

ALBY UNITED CARBIDE FACTORIES LTD., London, E.C.—Registered June 21, mortgage to London County Westminster & Parr's Bank, Ltd., securing all moneys due or to become due to the Bank; charged on limestone quarries at Eskett (Cumberland). *£132,947 1s. August 13, 1920.

LEADLESS WHITE MANUFACTURING CO., LTD., London, E.C.—Registered June 20, debentures securing an amount not exceeding the issued capital for the time being of the company (filed under sec. 93 (3) of the Companies (Consolidation) Act 1908), present issue £3,000; charged on all company's property at Yate, with plant, machinery, &c., also general charge.

SOMERSET OXIDE & OCHRE CO., LTD., Cheddar.—Registered June 20, charge, to London County Westminster & Parr's Bank, Ltd., securing all moneys due or to become due to the Bank; charged on Church Farm and pasture land at Cheddar.

Satisfaction

ACME CHEMICAL CO., LTD., Tonbridge.—Satisfaction registered June 21, £1,200, part of amount outstanding July 1, 1908.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

BEACH, W., 86, Farm Road, Sealand, Cheshire, acetylene welder. £12 1s. May 10.

SIMMONDS, H. J., 58, Stephens Road, West Ham, chemist. £10 5s. 5d. May 11.

STEWARTS DRUG STORES, 522, Barking Road, London, E., druggists. £18 5s. 6d. May 5.

BENSON, S., 12, Clifton Road, St. Lawrence, Ramsgate, wholesale druggist. £16 13s. 2d. May 14.

DOWSONS, LTD., 2, Market Place, Colne, chemists. £17 13s. 3d. May 5.

CASSON CHEMICAL CO., LTD., 44A, Westbourne Grove, London, chemists. £15 17s. 2d. May 5.

CASSON CHEMICAL CO., LTD., 8, Westbourne Grove, London, chemists. £13 3s. 4d. May 5.

DODDS DRUG STORES, 35, Hampstead Road, London, N.W., chemists. £11 19s. 6d. March 7.

EDWARDS, J. M., 311, Fulham Palace Road, London, chemist. £10 18s. 8d. May 3; £19 12s. 9d., May 12; £26 7s. 1d., April 18.

NAGELS & CO., 51, Fenchurch Street, London, E.C., chemical merchants. £13 18s. 11d. May 2.

SAPODA LTD., 5, New Court, Lincoln's Inn, London, manufacturing chemists. £18 17s. 10d. May 3.

IRVINE, J., Kendal, chemist. £18 12s. 1d. May 13.

KERSHAW, J., Rose Mount, Menston, dyer. £16 11s. 8d. May 20.

German Nitrate Prices

A GENERAL advance of about 2·50 marks per kilo in the price of nitrogen fertilisers has been authorised by the German Government as from June 1. Superphosphates have been reduced 3·60 marks, due chiefly to Government subsidised imports of crude phosphates.